News of the Industry Begins Page—796

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AUTOMOTIVE INDUSTRIES
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Is the Automobile Industry Destined to Lead in Air Development?

Ford, Packard and other manufacturers already in field as new day dawns for aviation in America

By John C. Gourlie

ARE we on the brink of a development in commercial aviation that will rival in extent the expansion of the automobile business during the past twenty years?

Detroit thinks so, and Detroit's confidence in the automobile was not misplaced.

Besides, there are responsible elements in other communities which hold the same opinion. Contrary to what appears to be the general impression, by no means all the development of commercial aviation is being done in Detroit. In many widely separated sections new enterprises are springing up and research work started years ago is being accelerated.

Handicapped by lack of funds for experiment and by public apathy toward airplanes except in their military uses, the pioneers of American aviation have, nevertheless, done magnificent work, and their lifelong efforts now appear destined for adequate reward.

The rapid aboutface in the airplane situation during the last few weeks, which has brought what seemed like a distant possibility very close to an actuality, was occasioned by the passage of the Kelly Bill, giving the Postoffice Department power to turn its air mail services over to private interests.

The scramble for these contracts has brought into the limelight the interests which are at work to put over commercial aviation, and the country at large has awakened, with considerable surprise, to the fact that men of high standing in the business community are back of the movement.

Capital is going into airplane development and this has been the crying need of the industry since its inception. Support from the Goverment has made possible a constant improvement in military types, but all that has been available for research on the commercial side has been the profits from military work. The situation is very different now.

Photo by International

Henry Ford talking it over with Pilot Edward G. Hamilton just before the take-off of the Maiden Dearborn on its initial flight as a commercial carrier between Detroit and Chicago

There is very little doubt that many of the Government air services will be taken over by private companies. The Postoffice has already invited bids for two short routes, and is understood to be preparing to offer some of the longer ones, including that from New York to Chicago. On a four-fifths return from the postage collected for the mail sent by

these routes, it is calculated that they can be made to show a profit.

Whether purely commercial routes, dependent upon express matter or passengers, can similarly be made to pay under current conditions has yet to be demonstrated. It may turn out that further education of the public may be necessary and further development of planes that can be operated economically.

The Ford Motor Company's experiment, for this reason, will be followed with intense interest. A daily check is being made upon the costs of the service inaugurated by Ford between Detroit and Chicago, and a few months will tell the story of what charges would have to be made to show a profit. Definite figures cannot be calculated in advance, due to many uncertain factors involved in daily operation.

Aside from the Ford trial route, it seems likely that others will be started in the near future. Men closely in touch with the situation are convinced that there is a need and a demand for fast freight and passenger service between the large cities, and that they can be operated without support from the Government.

The American Railway Express Company, for instance, has informed airplane men that of the seventeen cars of express matter that it dispatches daily between New York and Chicago, a substantial proportion could be made to pay the higher rates necessary by routing through the air.

The Ideal Transportation

From the standpoint of pure economics, airplanes and airships are the ideal forms of transportation. They can go anywhere over land or sea, combining thus the advantages of all the present means of transportation, from the lowly bicycle to the ocean liner. Once they are in the air, their principal item of cost is eliminated, for the upkeep of highways and road beds is not required.

If this is accepted as true, then it is pertinent to inquire why present costs of airplane operation are admittedly high as compared with the established transportation systems.

High cost of equipment is one of the most important factors. Under present conditions, commercial airplane production virtually represents custom work. The economies of large scale production still lay in the future, and there is the additional consideration that the expense of research has been all out of proportion to the number of planes actually sold. There is a big difference in spending $200,000 in improving a motor car engine when the cost in a year's time can be spread over 50,000 units, and devoting an equal sum to designing a better airplane, of which at most a few hundred can be sold.

Promise of Lower Costs

The prospective development of commercial services bears the promise of lowered costs. More planes will be built, with resultant economies, and as costs are reduced the services will expand—or so everyone hopes.

There is still much to be done in the way of engine design. Lighter types are needed than those developed for military purposes and still used to a large extent in the commercial planes.

Ford, Packard and others in the automotive field, and many in the airplane industry, have turned to this feature of aeronautical development, and with the recent impetus given to research, improvement should be steady and rapid.

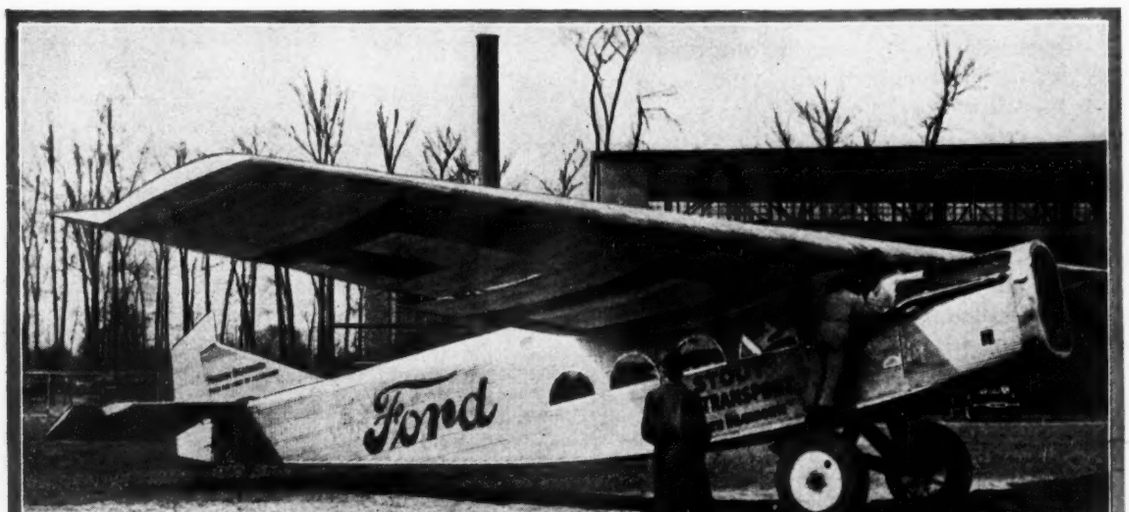
But when the problem is reduced to its essentials it will be found that the principal obstacles to commercial development have not been on the technical or production side. More potent are the following:

1. **Lack of airways—including landing fields and service stations.**
2. **Lack of public interest and confidence.**

The first is being slowly eliminated. Ford has established an airport at Dearborn, and local interests at Cleveland and Toledo have recently launched plans for building service stations and landing fields. Local pride is proving a powerful stimulant, and it appears likely that within a few years every community of commercial importance will have its air station.

The second obstacle may remain longer in the path. Capt. E. V. Rickenbacker points out that the men who are directing the commercial and industrial affairs of the nation today grew up when the airplane was in its infancy, and when fatal crashes were the rule rather than the exception. An attitude of mind was thus formed, and the airplane was marked as dangerous and unreliable. But consider the youth of the country, says Capt. Rickenbacker. Their ideas being formed during a period when airplane flight is comparatively safe. Mail and military flying is being done daily, and accidents are very few. The new generation will take aviation as a matter of course.

It is this psychological factor, rather than conscious



International Photo

The Maiden Dearborn, an airplane of the Stout all-metal type, made history when it landed at Maywood field, Chicago, after taking off from Dearborn, Mich. This flight marked the beginning of the Ford air transport business, which is expected to cover the whole Middle West within a short time. Photo shows the Maiden Dearborn getting ready for the hop to Chicago

design, that is plotting the course of airplane development. Many of the most ardent of aviation enthusiasts do not believe that the time is yet ripe for passenger services on a large scale. But it is thought that if express carrying services can be started in a small way business men will begin to patronize them, will find their products delivered regularly and rapidly, and gradually become used to the whole idea. Then the time will arrive that, when they want to reach a distant city in a few hours to beat a competitor, they will think of the air service and utilize its advantages.

When you consider competition you have reached the kernel of the nut. It is competition that has led to the growth of all the other speedy, efficient and highly organized transportation systems of the day. The need for carrying products quickly and safely from point to point, originating in competition among shippers, has led to competition among the carriers, and the result has been constant improvement. The same forces will operate to stimulate aviation.

This emphasis on the freight and mail carrying aspects of aviation has one extremely favorable aspect. There will be no "air flivvers" for a long time. It is a curious fact that there is nothing to prevent the average citizen going out and buying an airplane, stepping into it and driving off. Nothing, that is, but almost certain death. Many years' preparation will be necessary before the automobile driver becomes an airplane driver, and meanwhile safety devices will be multiplied.

It is presumed that as passenger carrying services develop, individuals will acquire planes and hire pilots. In years to come piloting will be simplified and the owner will be encouraged to take his turn at the controls. The situation here is analagous to that of the automobile industry twenty-five years ago, when only highly qualified chauffeurs drove cars and they were held somewhat in awe. Who would have predicted then that today nearly everyone would be a driver?

Comparisons between airplanes and automobiles bring up a highly interesting point. Will the automobile industry assume and maintain the leadership in aviation development? The possibilities are there. The industry has capital and it has made of quantity production a science. Two of the greatest fields for aeronautical advance are in motors and metals, and car manufacturers have drawn to their service to attack these problems the best engineering ability of the nation.

Still an Open Question

But whether a portion of this capital and engineering science will be diverted to airplanes is still an open question, except, perhaps, so far as Ford and one or two other companies are concerned. The opportunities exist, the doubtful factor is whether they will be seized. For it is not on record that the men who built up one great industry have ever done a similar service in another. Man is only equipped with a certain amount of energy, and the energy required for a shouldering of the manifold problems of aviation is very great indeed. What active interest there is in airplanes in the automobile industry is mainly confined to the younger men.

The spectacular entry of Ford into the airplane picture has served to obscure the fact that aviation development is still pretty thoroughly in the hands of the aviation pioneers. Five or six companies have built commercial planes, either for the air mail service or for prospective private enterprises in the freight or passenger carrying field.

They are General Airways, Inc. (Sikorsky plane); The Curtiss Airplane & Motor Corp., Boeing Airplane Co., Glenn Martin Co., G. Elias & Bros., Inc., Aerial Service Corp. and the Stout Airplane Co. The last-named is the only one that is closely identified with automobile interests.

Photo by International

Three men who are taking a prominent part in the present development of commercial aviation in America: Left to right—William B. Mayo, chief engineer of the Ford Motor Co.; W. C. Stout, head of the Stout Metal Airplane Co., and Edsel Ford

There is one aspect of the current situation, however, that promises a great deal for the part automobile men are to play in aviation. Ford is also interested in the Aircraft Development Corp., of which Ralph Upson is the guiding genius, and this enterprise is at work upon commercial dirigibles of an all-metal type. The prospect is that the Upson company will soon have a factory at Ford Airport in Detroit and begin production.

Airship Best for Commerce

The significance here is that aeronautical experts believe the heavy freight and long distance passenger carrying air vehicle of the future will be the airship. The big trunk lines and the transatlantic lines will be operated with airships, and airplanes used as feeders and for covering the shorter routes.

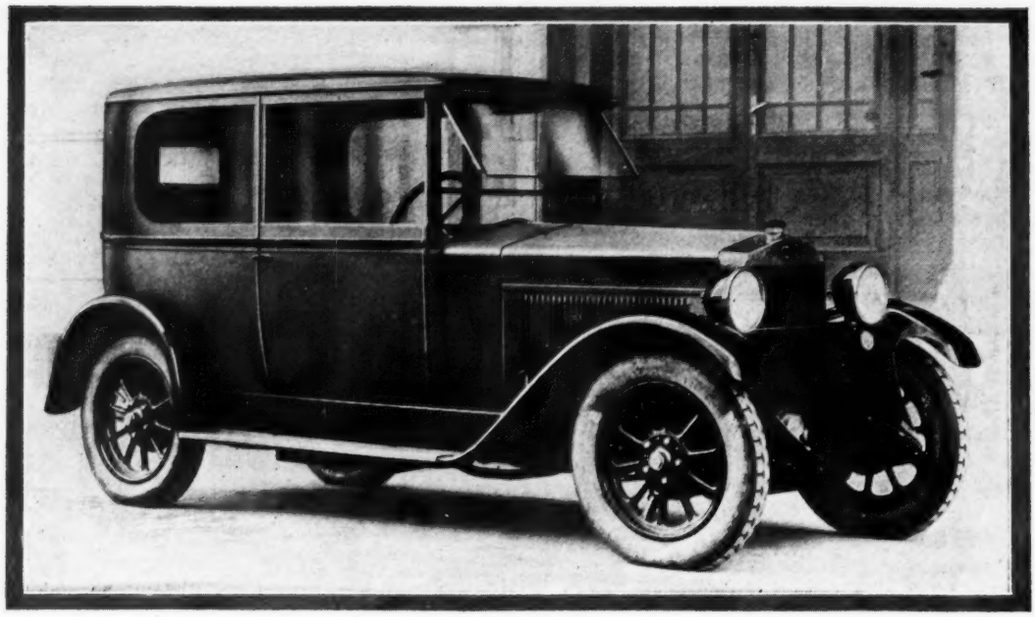
The picture of aviation twenty-five or fifty years from today, as seen by the enthusiasts, is indeed startling, but who shall say it is entirely fanciful?

At that distant time, it is predicted, both planes and airships will be many times larger than they are now. Five-thousand foot dirigibles will be in operation, and for economy's sake they will stay up in the air for a year at a time. Smaller dirigibles will set out from cities with passengers, new crew members, freight and supplies, moor on top the big ship at 10,000 ft. and discharge their loads.

So much for the commercial side. There will be millions of private owners driving planes in which the safety factor has been raised to the ultimate. Whether or not the helicopter principle is successfully applied to airplanes, these aircraft of the future will take off and land in very small places. The tops of large buildings, or several buildings of uniform size interconnected at their roofs, and roofed-over streets will afford landing places in the heart of the cities.

Then the social and trading areas of the cities will be twice or three times as great as they are now. For purposes of travel and shipping, the country will be no larger than Texas is today, and the nations of the world will be brought correspondingly closer together.

A dream this may be called. But it is in such dreams that the foundations of progress are laid. Only twenty-five years ago the automobile as it performs today was a dream.



The new four-passenger sedan Fiat with 60 cu. in. motor

Small 4-Cylinder Fiat in Production

Engine has displacement of only 60 cu. in. Four-wheel brakes and balloon tires standard. Open and closed bodies.

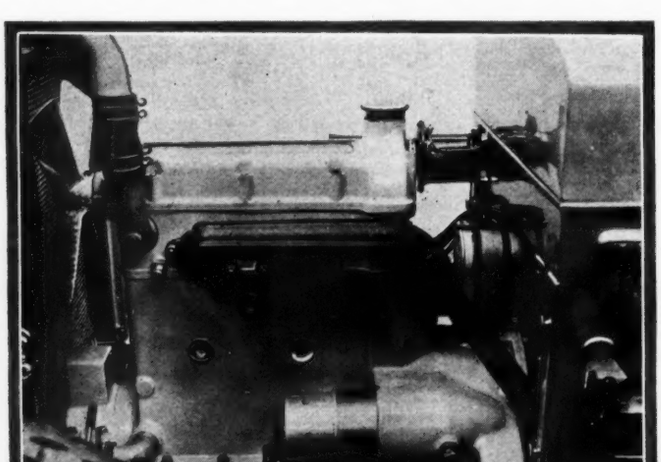
By W. F. Bradley

FIAT has decided to come on the market with a four-passenger light car having an engine of only 60 cu. in. piston displacement, which is smaller than some motorcycle engines. The Italian company is preparing for big production and has erected a new factory by the side of its model works in the suburbs of Turin specially for the construction of this model.

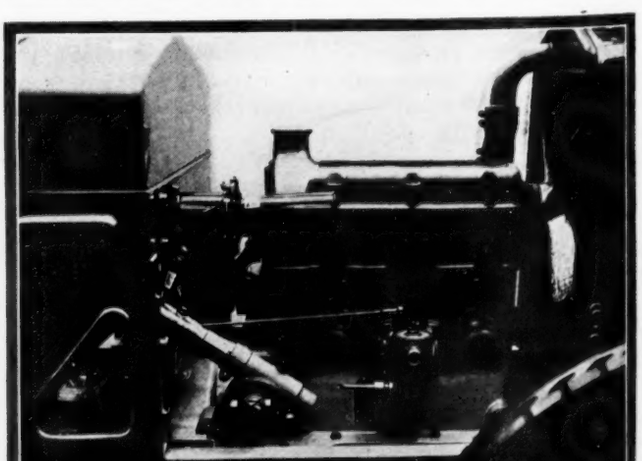
Originally intended as a two-seater, the engine size has been slightly increased and the wheelbase lengthened to 100 in. The track is 47.2 in. and four body styles are being standardized—an open four-seater, a two-seater, a cabriolet and a four-passenger two-door sedan. Up to the present prices have not been announced.

Outstanding features of this new Fiat, the smallest ever built, are a four-cylinder overhead valve engine with overhead camshaft having rear end drive, four-wheel brakes with an automotive servo mechanism acting in both a forward and reverse direction, and balloon tires.

Bore and stroke of the engine are 57 by 97 mm. (2.2 by 3.8 in.), giving a piston displacement of 60.4 cu. in. Cylinders and upper half of the crankcase are one casting, a detachable head is used, the valves are inclined in the head and are operated by an overhead camshaft driven by silent chains from the rear end. While this construction has advantages from the production stand-



Exhaust side of engine showing rear end drive to overhead camshaft



Carbureter side of four-cylinder, 60 cu. in. Fiat engine

point, the deciding factor in preferring rear-end to front-end camshaft drive is the absence of vibration and consequent greater longevity as proved by racing experience.

The camshaft drive is in two stages, first from the crankshaft to an intermediate pinion driving the magneto through an elastic coupling, and from this to the camshaft. This places the magneto on the top of the clutch housing and partially under the toe boards, but access is assured to the contact breaker and the distributor by means of a detachable plate. A four-blade aluminum fan is driven off the front end of the camshaft through a flexible coupling and water flow is by thermo-siphon with a single water outlet and an inlet at each side of the cylinder block.

Lubrication is of the high pressure type through a drilled crankshaft to the two main bearings and the connecting rods as well as to the overhead valve gear. The main filter and the oil pressure regulator are external on the carbureter side of the crankcase and electric connection is made to the gage by which a blue light is shown on the instrument board if the oil pressure drops below normal. A float with a graduated gage on the side of the crankcase shows the quantity of oil in the engine and the supply is renewed through a combined filler and breather on the top of the camshaft housing. The engine is stated to show the peak of its power at 3500 r.p.m.

The crankshaft has a diameter of 1.7 in. The I-section connecting rods are machined all over and pistons are aluminum alloy.

A cast aluminum support, bolted to the top flange of the frame members, carries the 7-gal. gasoline tank which feeds by gravity to a standard Fiat carbureter bolted to the cylinder casting without any external intake manifold. One-third of the gasoline supply is held in reserve and is put into communication by means of a three-way cock.

The 6-volt electric generator is driven off the front end of the engine shaft through an elastic coupling. A separate starting motor is used and is carried in a barrel housing forming a part of the cylinder and crankcase casting.

The general layout of the gearbox, torque tube and rear axle is similar to that of other Fiat models.

The brake layout is an original design comprising a patent automatic servo mechanism in each of the four wheel drums which holds equally for both directions of motions. The application is by pedal simultaneously for the four brakes, with separate control by lever for the rear wheel set. There is no brake on the transmission. To minimize attention, all the brake control shafts are mounted in a simplified type of ball bearing.

Spring shackle bolts, steering gear connections, etc., have the Alemite type of greaser. Semi-elliptic springs are used front and rear. Standard equipment is detachable hollow spoke pressed steel wheels with Michelin 28 by 4½ in. low pressure tires.

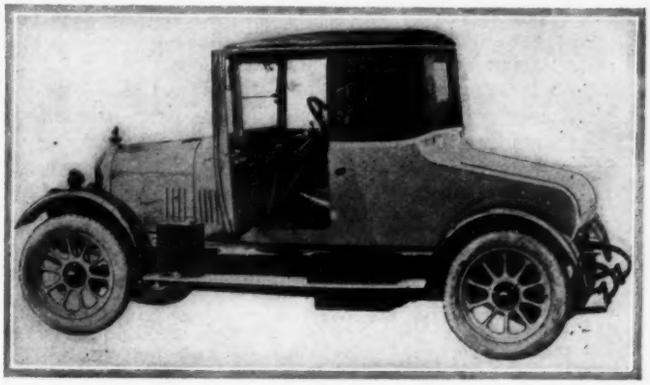
Side curtains are stowed behind rear seat on the new Fiat open models

Morris, of England, Adds 4 Cylinder Coupé Model

MORRIS MOTORS, LTD., whose output in comparison with that of any other British maker bears a similar relation to the Ford output with the production of other American manufacturers, has added a new model to the range of complete cars supplied with the Cowley chassis. The latter is the smaller of the two types of Morris cars, having a four-cylinder engine of 94 cu. in.

The new model is a fixed head coupé, upholstered in blue leather-cloth and provided with arm-rests and trays under the cowl for small parcels. Offered at £210, it is finished in blue with black fenders and black top. Side windows occur above the doors and are provided with automatic regulators.

The price compares with £175 for the open two-passenger with folding fabric top. Behind the main seat is an exceptionally roomy "boot," with a comfortably upholstered double dicky seat. The equipment is of the same comprehensive nature as on other Morris cars and includes spring gaiters, Gabriel snubbers and Dunlop balloon tires; front brakes are not, however, available on this model, either as standard or an extra, only the Morris "Oxford" types having that feature.



New Morris Cowley fixed-head coupé with double dicky seat. Price is £210

Just Among Ourselves

Convention Season Is Here Again

THE spring convention season is with us again. Within the next few months men will gather from all parts of the country, sit in smoke-filled rooms, listen to papers on every automotive topic under the sun and air their views of this and that for the benefit of their fellow workers in the automotive cause. After the smoke has cleared away, what then? Will the wheels of industry go round with less friction, will waste in manufacturing be reduced, will service station methods be more efficient, will merchandising methods be more sound? If the conventions achieve the purpose for which they are called all these questions can be answered by the single word "Yes." We know something of the work that is being put in to make the coming automotive conventions practical and useful and believe that really constructive exchange of ideas is going to take place. The gatherings will be worth going to. The set programs are going to be good. The meetings will be successful in proportion to the mental activity of those who participate in discussions of the various topics. The longest speakers aren't always the most active mentally.

Training Men for Commercial Aviation

WHEN the need for larger numbers of trained men in aviation arrives there should be no lack of supply in the United States. Aviation is a young man's business for the most part and its newness and possibilities appeal especially to the young man of today. The recent activity in commercial aviation already is being reflected in the universities of the country. New York University, for instance, reports something over 200 inquiries since Jan. 5 received by the Dean of the College of Engineering regarding courses in Aeronautical Engineering and industrial aviation. The inquiries have come from every part of the country, from high school graduates, college students, pilots, draftsmen and from men already engaged in some phase of aviation work. N. Y. U. reports, also, considerable success in placing men in aviation following graduation, 80 per cent of last year's class having been provided with positions within two months after graduation.

Bond Issue and Straw Men

EX-GOVERNOR FERGUSON of Texas went on the warpath about good roads again last week. He is greatly perturbed about the future generations. He fears that they will be overwhelmed with the burden of road bond issues placed on them by the people now alive. He decrys the issuing of forty-year bonds to build four-year roads. Well, nobody can argue with him about that. If any state has been issuing forty-year bonds to build four-year roads, somebody must be riding in a Rolls-Royce that ought to be driving a Ford. Fighting such a spectre as this, Pa Ferguson gives the impression of having set up a straw man for the purpose of knocking him out with one punch.

Buying Automobiles Is Buying Transportation

BUT when he gets excited about the spending of $500,000,000 for the 700,000 automobiles operating in Texas, and about the $325,000,000 he says is spent annually in their upkeep, he must find himself with a good deal less support. All that money represents business done in Texas to the profit of Texas merchants. From the owners' standpoint it represents investment in the most flexible and useful form of transportation available for the average man, not to mention its being an investment in health and in needful recreation. Pa says that thousands of persons are mortgaging their chances of a home for the possession of an automobile." Isn't that terrible? Isn't it conceivable that a man might live a more useful and pleasant life with an automobile that enables him to move quickly from one place to another than with a home which ties him down to a particular locality and thus limits his flexibility of movement?

"Own Your Home"— Fetish or Principle?

WE haven't a thing against owning a home, but reason is a useful companion on any mental journey. It is possible to make the "own your home" slogan a fetish or a religious creed enveloped with an aura of sanctity resembling sacredness that is entirely unjustified by a logical study of the entire situation. It is significant that Pa didn't cite any figures as regards the trend in home ownership to show the detrimental effect of automobile buying on this form of investment. As a matter of fact the automobile, by making it possible for people to travel quickly from outlying districts to work in centers of population, has permitted many people to own homes who never would have been able to do so had their buying possibilities been limited to the high-priced areas served by the older forms of transportation. Investment in automobile operation is investment in transportation just as much as railroad fares are investments in transportation. We haven't heard anybody wringing their hands about the amount of money spent in railroad fares.

—N. G. S.

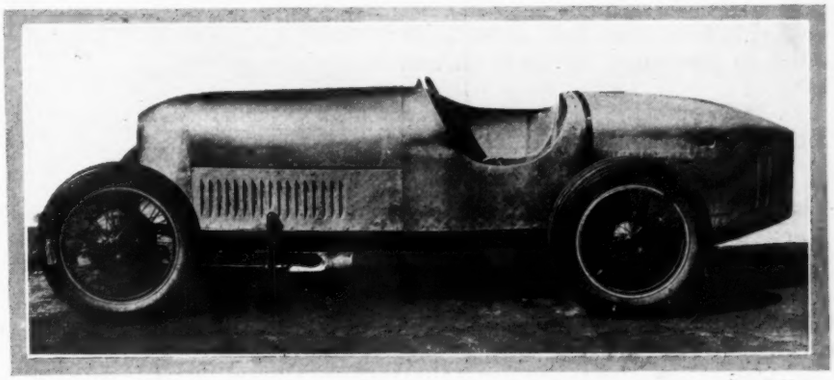
Guyot to Try for Victory at Indianapolis with Sleeve Valve Motor

First time engine of this type has been used in a big race. Displacement is 122 cu. in. Cylinders cast of aluminum alloy.

Albert Guyot

TWO Guyot Specials, to be driven by Albert Guyot and Maurice Rouvier, will represent France in the coming 500-mile race at Indianapolis. Albert Guyot, who is an old-time professional driver, will thus make his sixth appearance on the Hoosier track, while Rouvier, a wealthy sportsman and son of an ex-chief of the French Government, will race for the first time in America.

The Guyot Specials have been built privately in Paris to the general designs of Albert Guyot, who has embodied in them his years of racing experience. Three cars are under way, but owing to shortness of time only two will be shipped on the liner France at the end of April.



Racing car built for Albert Guyot for the forthcoming 500-mile race at Indianapolis

For the first time in the history of first-class racing a sleeve valve engine will be pitted against the poppet valve variety, for Guyot has decided on the McCallum single sleeve valve engine, better known to the public as the Argyll, by reason of its adoption by this British firm some years ago. The advantages claimed for this are exceptionally big valve ports permitting complete filling and scavenging of the cylinders without any of the lubrication difficulties attending some other types.

Six cylinders of 70 by 86 mm. (2.75 by 3.38 in.) are used, the cylinder block being an aluminum casting with pressed-in cast iron liners. There is a separate head for each cylinder, this being of Alpax metal and held down by six studs, of which two are common to a pair of cylinders.

Largely by reason of the absence of cast iron (with the exception of the cylinder sleeves) the weight is very low, the entire unit, comprising engine, clutch and gearbox weighing only 440 lb. This weight reduction has been carried throughout the car, although the Guyot specials will have no difficulty in passing at the minimum of 1400 lb. required under the rules.

Each sleeve weighs 21 oz., including the collar and the stud by which it is driven. Near the head of the sleeve are two openings for the intake and two for the exhaust, while near the bottom of the sleeve are two additional openings for exhaust at the end of the power stroke. The useful area of a pair of upper ports is 0.71 sq. in. and the duration of opening of these ports corresponds to 230 deg. of crank motion, while for the pair of lower ports the area is 0.63 sq. in. and the duration of opening 90 deg. of crank motion, making the total area of exhaust ports 1.34 sq. in. per cylinder.

With its combined reciprocating and helical movement, the sleeve is driven by a camshaft with spur gearing from the crankshaft, and from this latter by a counter-weighted eccentric shaft at right angles to the main shaft. By reason of the separate operating gear for each sleeve, the designer had six points from which he could take auxiliary drives, and has made use of three of these for the aviation type A.M. gasoline pump, which maintains the necessary level in the carbureter, the revolution counter and the water pump.

One of the engines has a single piece crankshaft, while the other has a two-piece shaft assembled by cone. Both are mounted in roller bearings, with 8 mm. rollers, and in addition there is a ball thrust bearing at the rear. The tubular connecting rods have split ends with two bolts and roller bearings. Either magnesium or Alpax pistons will be used in the race; in each case the piston pin floats in both the rod and the piston. Although not shown in the photograph, it is intended to run at Indianapolis with a Cozette type blower, driven from the front end of the crankshaft by chain and running at three-quarters engine speed. The blower draws through the carbureter, a Cozette, and, in consequence, this latter does not have to be balanced.

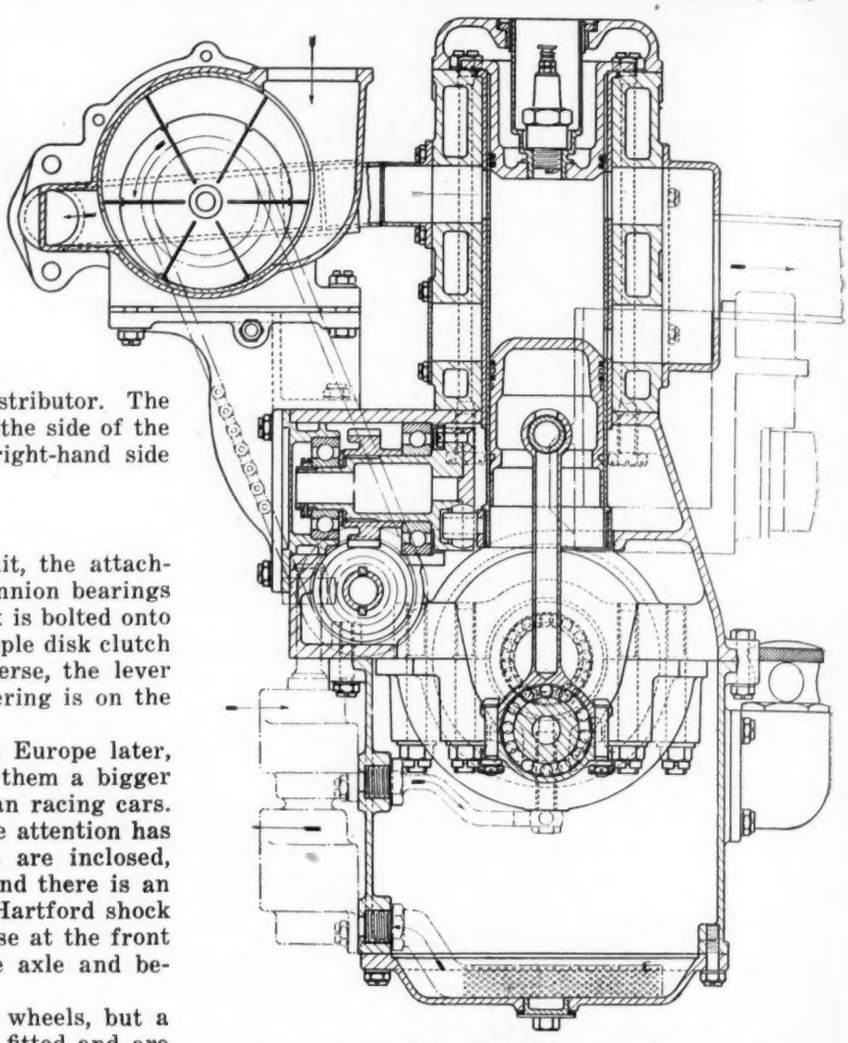
Lubrication is of the high pressure type, with dry base-chamber, the double piston pump being driven from the camshaft. There is direct feed to each of the seven main bearings, and distribution to the connecting rod bearings by oil collecting rings and centrifugal force. In addition there is a separate pump directing a supply of oil on the stud at the base of each sleeve. Because of the use of a supercharger, it has been considered advisable to cut a circular oil groove in each cylinder barrel about midway on its height and to deliver oil to this under pressure through a six-way distributor. The main supply of oil is carried in a tank by the side of the gear-box and the oil radiator is on the right-hand side and slightly to the rear of the engine.

Multiple Disk Clutch

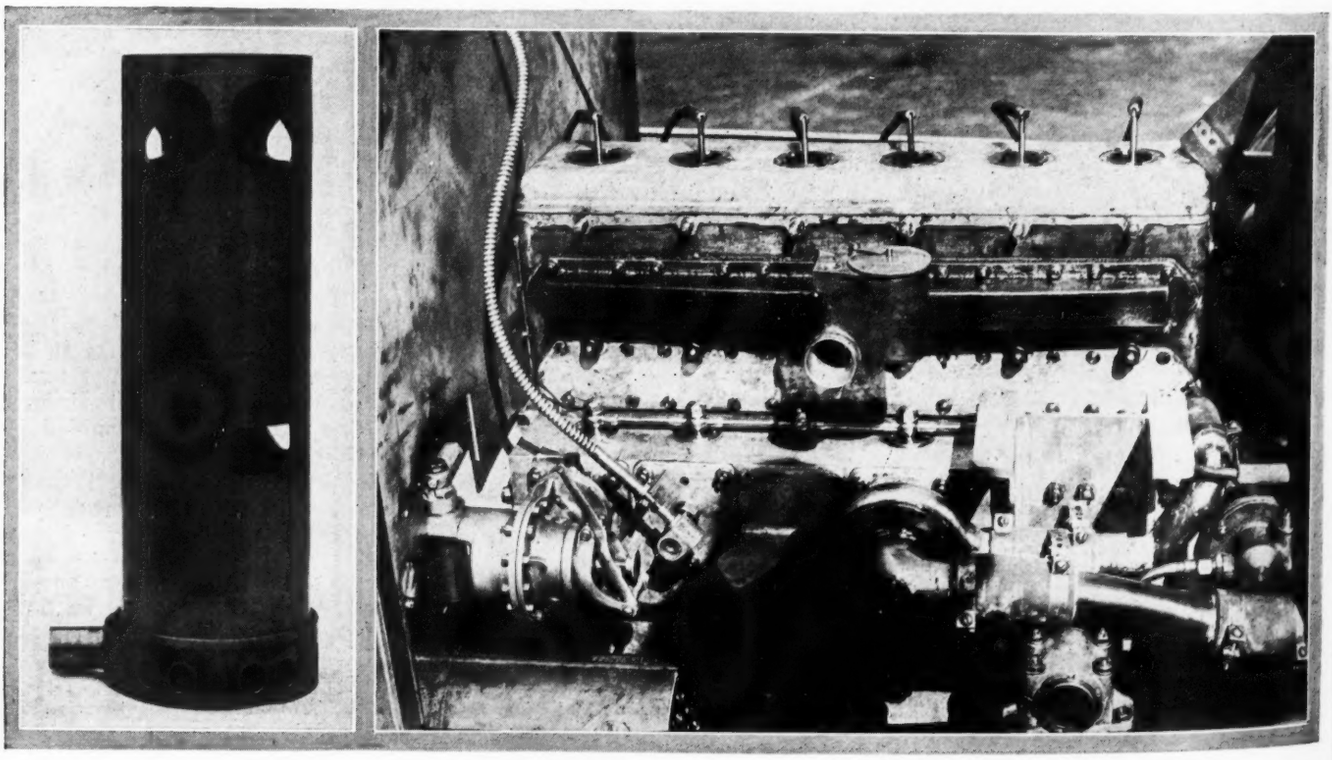
Engine, clutch and gearbox form a unit, the attachment in the frame being by a pair of trunnion bearings at the front, while at the rear the gearbox is bolted onto the central cross frame member. A multiple disk clutch is used. There are four speeds and reverse, the lever being on the top of the gearbox and steering is on the left.

As it is intended to race these cars in Europe later, two-seater bodies are fitted, which gives them a bigger cross section than is common on American racing cars. To overcome this handicap, however, close attention has been given to streamlining. Both axles are inclosed, with the exception of their extremities, and there is an absolutely unbroken flat under-surface. Hartford shock absorbers are fitted, but are inclosed, those at the front being mounted transversely ahead of the axle and between the frame members.

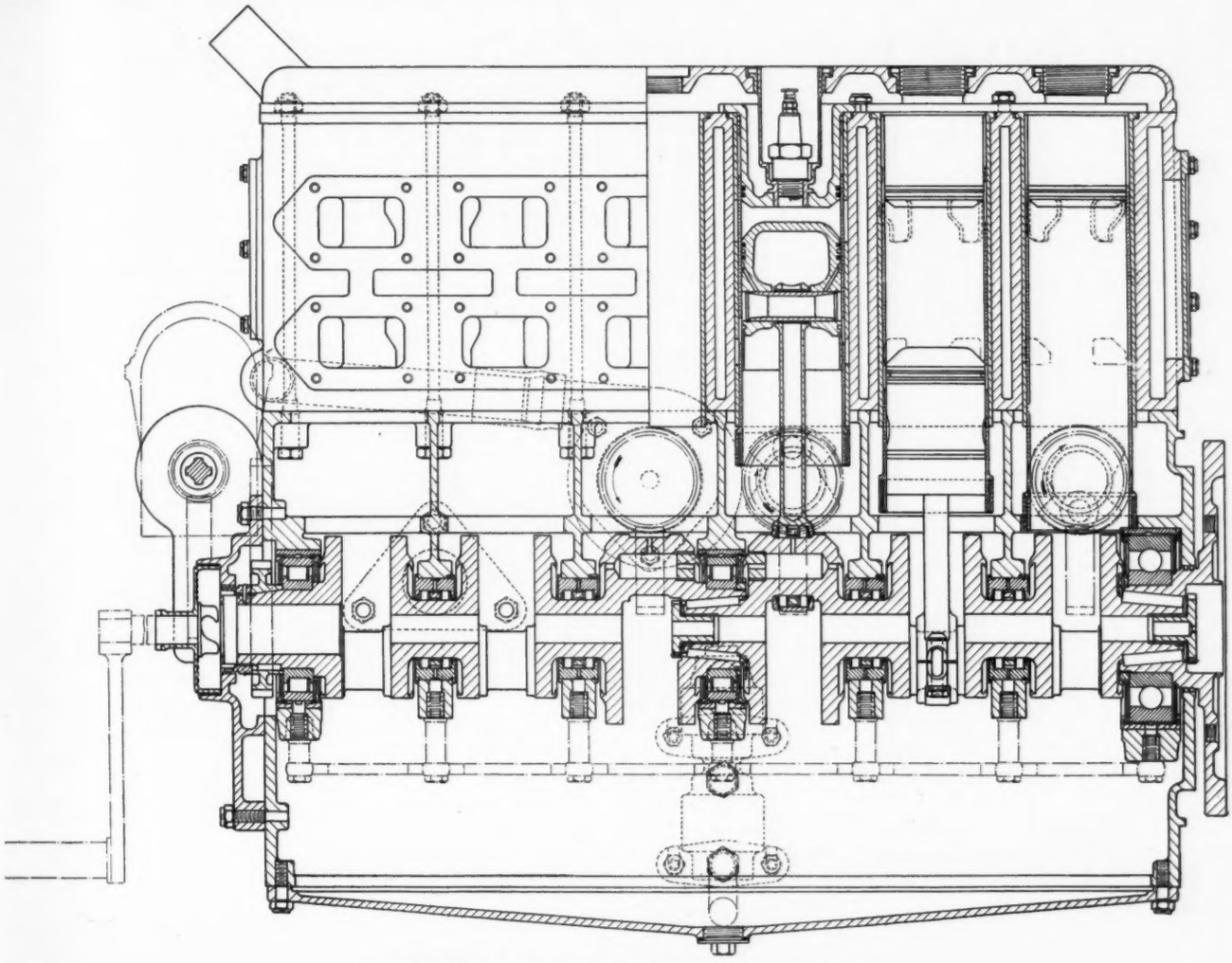
There are no brake drums on the rear wheels, but a transmission and front wheel brakes are fitted and are operated simultaneously by pedal. The front wheel



Cross section of Burt-McCallum single sleeve valve engine for Guyot racer



Single sleeve valve engine of Guyot racer. At left—Valve sleeve of Guyot engine, showing main and auxiliary valve ports



Longitudinal section of the Burt-McCallum engine

brakes are the Hersot patent, built by Lemoine of Paris, who is also responsible for the special axle, the center of which is of circular section and hollow, while the two extremities are of I section. The brake drums are in the axis of the wheel and there are no external brake controls of any kind, for the brake camshaft is mounted in the circular portion of the front axle and opens the two shoes at a point immediately under the steering pivot. No brake equalizers are used; there is separate adjustment for each shoe, and in addition the driver can take up wear by an adjustment by the side of the gearbox while the car is in motion. There is independent lever control to the transmission brake.

Parts Can Be Reached Quickly

Quick mechanical work has been thought of. The tail is held in position by a flexible steel band and one nut. The gas tank at the rear is also held by a flexible steel band at the front and a lug and a couple of bolts at the rear. The engine hood is brought right up to the steering wheel and on removal gives access to the entire mechanism. With the trunnion attachment it is only necessary to remove eight easily accessible nuts at the front and two bolts at the rear for the entire engine to be lifted out of the frame, after connections have been broken.

Springs are short semi-elliptics front and rear, the former being inclosed and the latter outside the body. Drive is taken through the springs and there is a tube for torque reaction. Wheelbase of the Guyot Specials is 96½ in. and track, which is uniform front and rear, is 47.2 in. Total height of the car is 40 in. Rudge Whitworth wire wheels are fitted, with straight side rims, but the make of tire is not definitely decided on.

In Next Week's Issue

A VALUABLE and interesting article in next week's issue of Automotive Industries will be "The Problem of Satisfactory All-Year-Round Engine Lubrication" by A. Ludlow Clayden.

Mr. Clayden goes thoroughly into his subject and presents a comprehensive study of the many factors involved, including engine temperature, oil viscosity, feed systems and dilution.

In this issue there will also be a description of fabric leather bodies as developed by several European manufacturers; piston rod production methods of an American engine plant and numerous other interesting features.

Unusual Range of Operations Possible with Vertical Automatic

Station-to-station type machine particularly adaptable to production of small parts involving a variety of operations about a common centerline. Can turn out 5000 pieces per day.

By W. L. Carver

AN unusual range of operations can be performed with the new Vertical Automatic, which is a vertical cyclic or station-to station type machine and particularly adaptable to the production of small parts involving a multiplicity of operations about a common centerline.

Due to the features of individual cam control for each of the work tables, and individual spindle speed adjustment, diverse operations such as the drilling of a long hole of small diameter can be produced economically in a cycle involving such other operations as top facing, large diameter drilling, straddle milling, knurling and practically every other basic operation.

Even with this variety, the feed and speed conditions at each station can be adjusted to the most advantageous figure. Parts in production are held in specially designed fixtures or any of the standard chucks which are compatible with the capacity of the machine and any of these can be interchanged readily.

Economical operation on fairly small lots is very feasible as all of the factors, including individual feed cams for any set-up, are readily accessible.

The machine is built by the Cincinnati Engineering Tool Co. of Cincinnati, Ohio.

As illustrated by Figs. 1 and 2, a front view of the complete machine and a side view with guards and cover plates removed, respectively, a cylindrical vertical column forms the center for the six spindle tool head, the six station work turret assembly and the feeding and indexing mechanism. This cylindrical column is supported at the upper end by an overarm which is part of the fixed rectangular sectioned column at the back of the machine. In turn, this rear column is bolted to the box section base which forms the drive gear case, a coolant compartment and the lower support of the cylindrical column.

Primary drive is obtained through a vertical belt from a 7-8 hp. motor, which is mounted at the top of the rec-

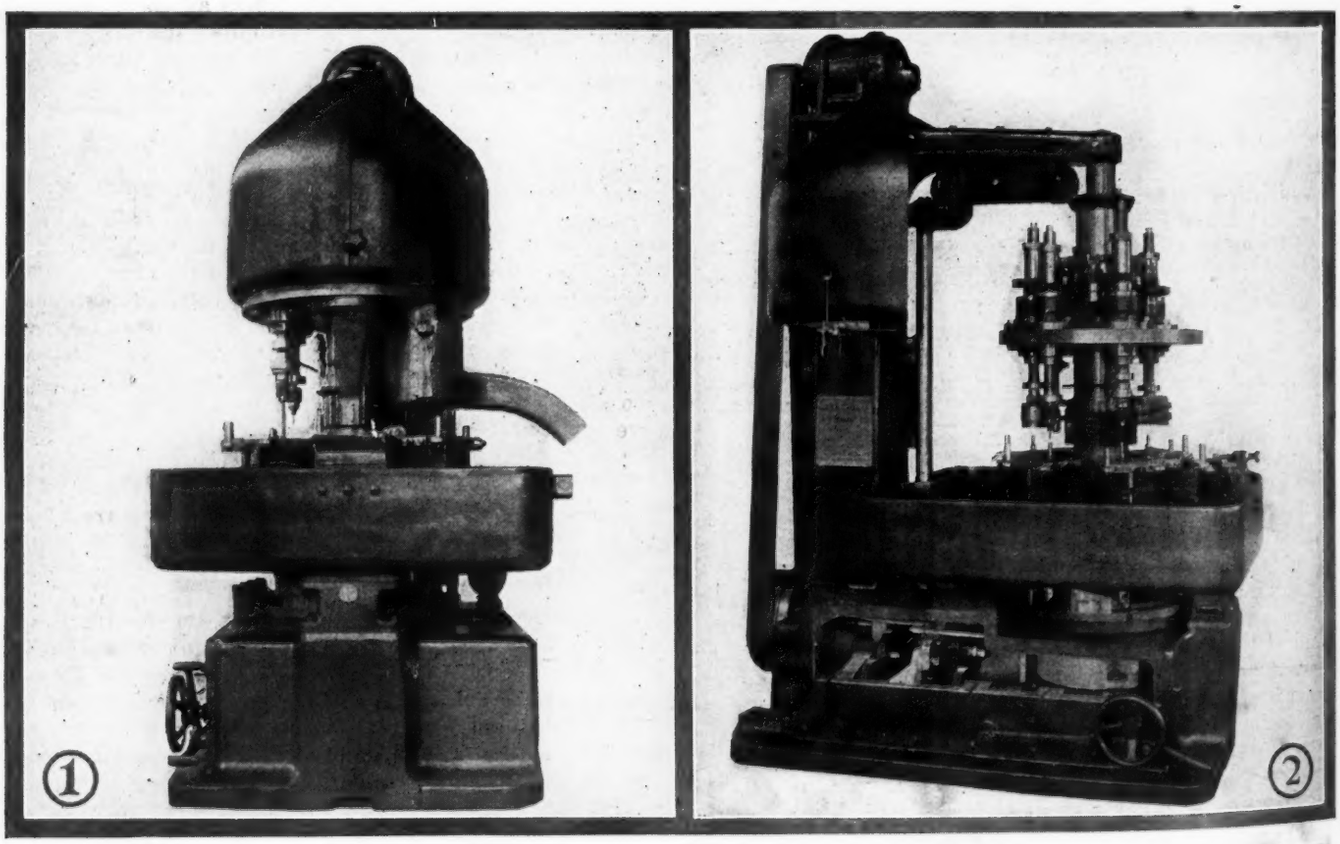


Fig. 1—Front view of Vertical Automatic, showing thorough enclosure and unique guard used in conjunction with hollow mill. Fig. 2—Side view showing spindle arrangement with some details of indexing and feeding cam arrangement

tangular rear column. The lower pulley is mounted on the main drive shaft, which also carries one of a pair of bevel gears at the inner end for transmitting rotation to a vertical shaft is located just in front of the rectangular column. The primary drive shaft also carries spur gears which are the first of the train for the operation of the turret head control.

At the upper end of the vertical shaft is another pair of bevel gears which drives a cross shaft that in turn transmits the drive to the master spindle drive sleeve through another pair of bevel gears. All drive shafts as well as the spindles and gears are high carbon alloy steel and are heat treated. Liberal use is made of ball bearings for all of the radial and thrust loads in the drive.

Spur Gear Drives Spindles

Near its lower end, the master drive sleeve incorporates a large spur gear which drives all of the five spindles through change gears, as shown in Fig. 2. A swing arm which carries the intermediate change gears is part of each spindle assembly and the spindles can be driven in either direction through a wide range of speed up to 1800 r.p.m. At the lower ends, the spindles are equipped with both a slotted flange and a No. 3 Morse taper socket for driving the tools. Each spindle with its quill is mounted in a separate flanged carrier which is piloted and bolted into a heavy ring that is fixed to the vertical column. As the work turret indexes to six equally spaced positions and one station is required for loading, five spindles are used ordinarily.

Spindles are threaded over their entire length and this feature allows vertical adjustment to suit the exact requirements of travel and height of work at each station for any type of operation. Adjusting nuts are located above and below the quills and are locked when the spindle is located suitably. The possibilities of the spindle arrangement will be discussed with some typical operations after the turret construction and operation are described.

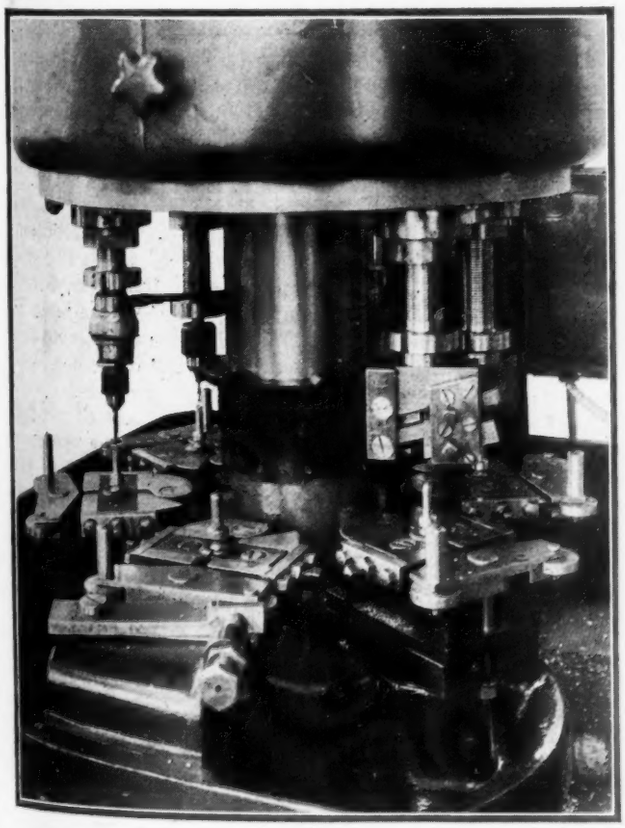


Fig. 3—Details of unique special fixtures and method of automatic operation by the adjustable shoe in the foreground

Turret Mechanism

Basically, the turret mechanism consists of two parts, the lower or circumferential indexing and feeding mechanism which is worm driven, and the upper assembly which consists of six work tables, each of which has its individual vertical slide. Change gears and an intermediate reversing gear and friction clutch drive, the worm of which actuates the turret and control, is by a treadle which can be seen at the front of the machine. The heat-treated worm gear meshes with a large cast-iron worm gear which is part of the indexing and feeding mechanism. This arrangement may be seen at the bottom of Fig. 2. As stated previously, each of the work tables moves vertically in an individual slide and all of these are incorporated in a turret construction which centers about the fixed vertical column.

A downward extension from each of the work tables carries a roller which engages with the segmental cams for feeding and indexing. Referring to Fig. 2, the cam carrier ring with the five cams moves to the left to move the work tables with fixtures and pieces up to the tools at the spindles. When the working portion of the operation has been completed, these rollers are guided down off of the rear ends of the cams and the work tables recede to the original level and are clear of the tools. Then as the turret is unlocked the cam carrier reverses and moves to the right for one-sixth of a revolution, carrying the upper table assembly with it to the next station.

The upper turret assembly is again locked in place and the lower portion carrying the feed cams reverses its direction to raise the work tables again. Therefore each cam remains under one particular spindle and can be adapted to the requirements of the operation at that station. In changing set-ups, all five of the segmental cams can be removed within five minutes as they are located on the carrier by bolts.

Depending somewhat upon the characteristics of the work, this machine will produce from 12 to 16 pieces per minute. The lower gear set is equipped with a brake and the entire machine can be stopped at any point in the cycle and then started again without difficulty. The hand wheel shown at the front of Fig. 2 is used for setting up. As shown by Fig. 3, each of the work tables is approximately rectangular and equipped with slots at three sides for holding down the fixtures. This figure also illustrates the interesting fixtures which have been developed in conjunction with the machine. Two jaws carrying formed inserts are operated by a walking beam lever equipped with rolls at either end. One jaw is equipped with a spring bumper which takes care of inequalities in the pieces introduced.

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Automatic operation of the jaws of the fixture is obtained by a shoe arrangement at the loading station, as indicated by Fig. 3. The fixture is opened by the contact of the forward roll as it enters the station and then reloaded and closed when the rear roll is depressed by the fixed shoe as the head is indexed to the next position.

A liberal oil compartment and circulating pump are located in the base and provide flood lubrication to all moving parts. The base is closed by cover plates and a cast pan is placed under the work table. The spindle drive assembly is inclosed by hinged cast guards.

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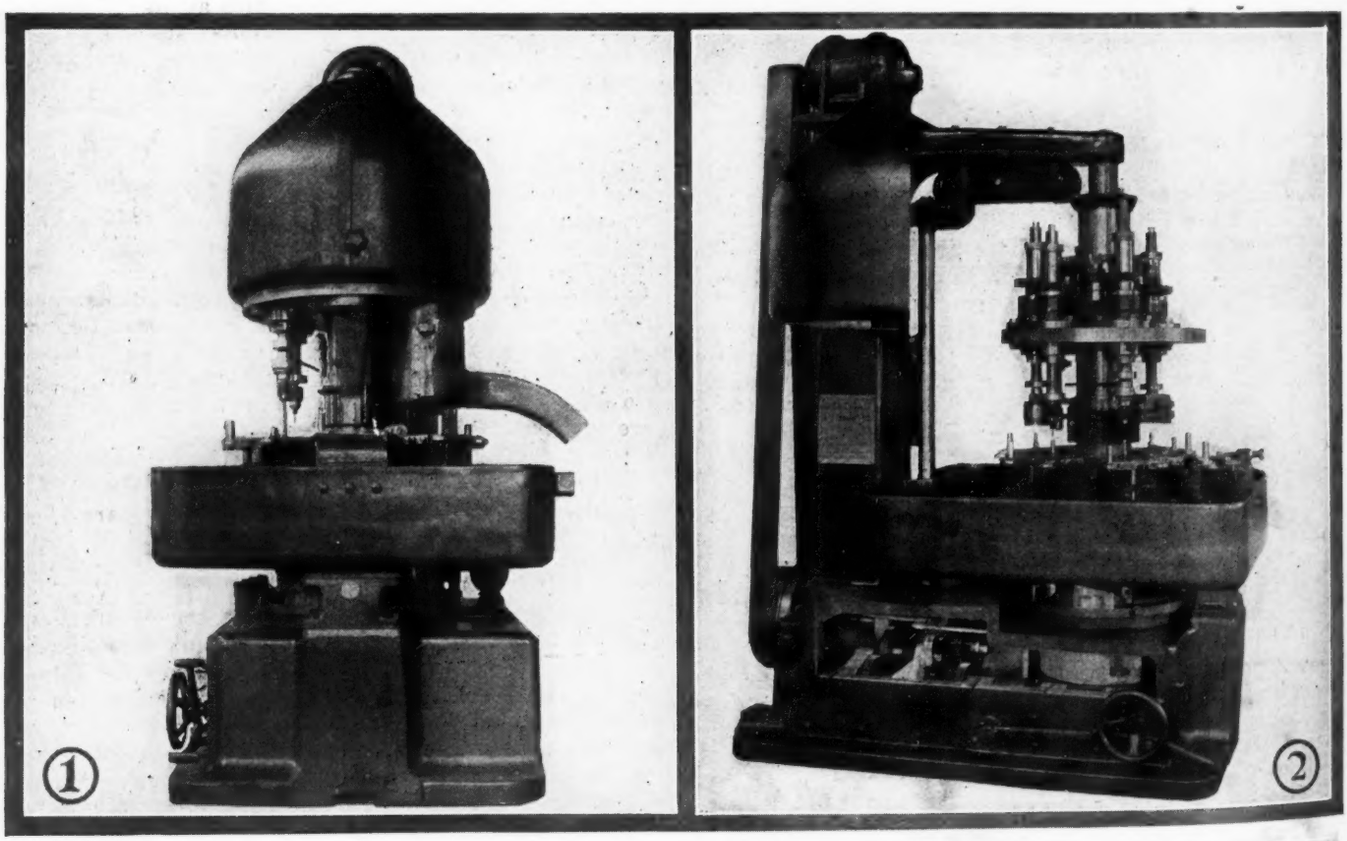

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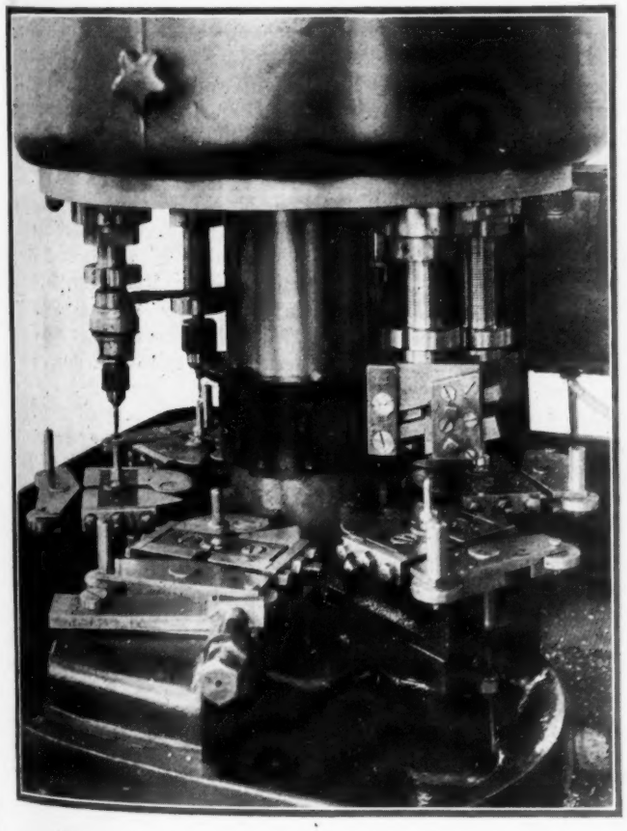

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A liberal oil compartment and circulating pump are located in the base and provide flood lubrication to all moving parts. The base is closed by cover plates and a cast pan is placed under the work table. The spindle drive assembly is inclosed by hinged cast guards.

As shown in Fig. 2, the tools are set up for the operations shown in Fig. 4. The sequence is as follows:

1. Load.
2. Hollow mill shank, including both diameters, top and face above large diameter.
3. Knurl upper end.
4. Chase the thread.
5. Tap drill upper end.
6. Tap.

This group of operations is fairly typical, although the range of modification is infinite. For tapping or threading operations, the feed cam is designed to elevate the work at a rate corresponding to the lead of the thread and the usual tapping heads reverse during the down stroke of the table. Fig. 1 shows an interesting feature in that the head carrying the hollow mill is surrounded by a guard which is similar in principle to the ordinary centrifugal pump. As the chips are thrown out of the hollow mill by centrifugal force, they pass through a volute chamber and out the spout at the right into a barrel. This feature is of great advantage, particularly when working brass or aluminum, where the rotating speeds are high.

While the tools are usually held in the spindle by draw bolts, a special spindle has been designed so that a small drill runs at correct speed inside of the usual box mill, making one station do the work of two. A cross feeding arrangement for under-cutting the lower ends of threaded or knurled projections is also included under the head of special tools. Special heads incorporating horizontal spindles for driving milling cutters in single or straddle operations has also been worked out for producing hexagons, squares or a variety of milled surfaces. The part as shown in Fig. 4 has been in production at the rate of 5000 pieces per day.

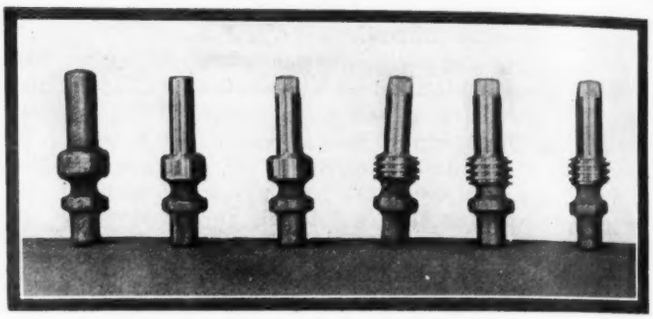


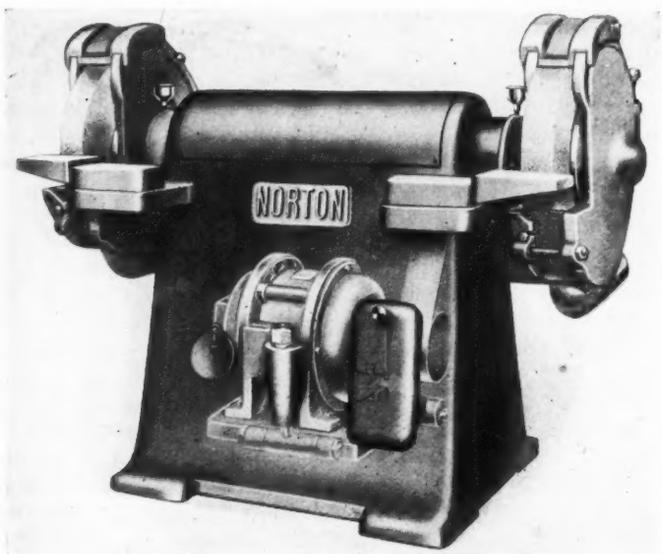
Fig. 4—Sequence of operations on a small brass part. Production rate, approximately 5000 pieces per day

By the use of suitable fixtures and tools, a great variety of work can be performed. Among other parts which can be handled are steering knuckle arms (taper and threaded ends), fan hubs, valve stem guide bushings, bearing cages, small shafts, distributor head brackets and a wide range of small forgings and castings within the capacity of the machine.

Norton Grinding Wheel Stand Has Motor in Base

A NEW design of grinding wheel stand with an electric motor in the base has been developed by the Norton Co., of Worcester, Mass., and is made in three sizes, for 16, 20 and 24 in. wheels. As may be seen from the illustration, the stand is of very substantial design, with large bearing area on the floor. The wheels are extended beyond the base to provide ample foot room for the operator. The spindle runs in adjustable roller bearings which are protected against dust and grit. Inside flanges are a sliding fit on the spindle and are driven by a key so that they can be easily removed.

Two wheel speeds are provided by means of an ingenious arrangement of pulleys whereby the larger telescopes the smaller. Drive of the spindle is by enclosed belt directly from the motor. Grease cups are provided for the spindle bearings and two openings with covers in the front of the base give access to the motor for oiling.



Norton Type S grinding wheel stand

The grinding wheels are inclosed in a combination protection and dust hood. This hood is made sufficiently strong to hold fragments of broken wheels. A nozzle at the bottom provides a means for exhausting the dust.

A REVISED report of the National Screw Thread Commission has been published as Miscellaneous Publication of the Bureau of Standards No. 61. It covers substantially the same ground as the Progress Report published in 1921, but the matter contained has been rearranged and some of the standards have been considerably revised, while additional material also has been included in the new work.

All specifications relating to a given class of product are now included in a single section. Among the more important changes made in the specifications as previously published are the following: The classes of fit have been renamed and renumbered; the tolerance on major diameter of screws of classes 3 and 4 has been made the same as for class 2; specifications for gages have been extensively revised, and the allowances and tolerances on fire-hose coupling threads have been revised to decrease the maximum permissible looseness. In general, any screw thread product which met the previous specifications will meet the revised specifications. New material added includes specifications for threading tools, recommended tool shapes, tap dimensions and tap drill sizes; specifications for screw threads of special diameters, pitches and lengths of engagement; specifications for gages for fire-hose coupling threads; specifications for wood screws; and the appendixes, which embody information supplementing the specifications.

Mechanical and Hydraulic Forces Combined in New Brake

Madden "compensating system" utilizes mechanical linkage for application and hydraulic pressure for equalization. Claimed to prevent skidding. Easy to adjust.

SEVERAL interesting features are incorporated in a new braking system, known as the Madden compensating brake, which utilizes mechanical linkage for brake application and a hydraulic system for equalization. The latter feature is better described by the word "compensation," as the braking effect, rather than the pressure exerted upon the brakes, is equalized. Oil is the fluid used.

All four brakes can be adjusted easily by turning a screw plunger at the oil supply tank, which may be located either on the dash or in the driver's compartment.

The system is the invention of E. J. Madden and is being introduced to the trade by Edwin F. Willet of Detroit.

Identical internal band brakes are used at all four wheels and each band is so floated that a very appreciable self-energizing action is set up, which is fully effective in both directions. Due to the compensation feature and the self-energizing action, a light application of the brake pedal produces a soft, smooth stop, without chatter at the bands and without any skidding tendency.

The writer has driven a car weighing about 4200 lb., equipped with this system, at various rates of speed over both wet and dry pavements. Stops were made from various rates of speed with the clutch released and the steering wheel uncontrolled. In each instance the stop was uniformly smooth, with no change in the direction of the car and no rotation of the steering wheel.

On account of the compensation feature no release of the outer front wheel occurs while in a turn. On the other hand, the application of the brakes has no appreciable effect on steering. The car was driven in low gear with the brakes applied and could be swung rapidly from side to side of the street and around sharp corners.

As illustrated by Fig. 1, which is typical of all four brakes as regards details of the brake proper, a rolled steel band of ⅛ in. thickness is supported by two arms hinged around the axle center. The brake lining is attached to the steel band by tubular rivets. The band is made of .40-.50 carbon steel, rolled hot and cooled in air to give it some of the characteristics of a spring. This treatment is said also to insure a true circular contour. At the bottom the band is guided and the clearance between it and the drum is adjusted by means of two threaded studs having heads of a spiral outline. The spiral extension on these heads fits into light slotted strips which are riveted to the band and therefore guide it laterally. Radial adjustment for band clearance is obtained by turning the stud to the proper angle to bring the spiral extension in contact with the inner face of the band at the proper position. As this adjustment requires less than one-quarter turn of the stud, the lateral adjustment is not affected appreciably.

As both of the upper supporting pins are installed in levers which swing freely around the axle center, the brake band floats and is restrained in the idle position by two coil springs. Considering the brakes on the righthand side, as the spring to the right of center exerts a greater pressure than the spring to the left, the band swings to the extreme counter clockwise position when released. As shown by Fig. 1, the rear support is at the upper end of one of the arms of a bell crank. A pin is set in the outer end of the lower arm of the bell crank and contacts with a cast cup, which forms the piston of the hydraulic cylinder. This cup carries a rubber packing cup and is not attached to the piston pin. Pressed steel is used for the cylinder, which is fastened at its upper end to the bracket on the brake carrier plate by a threaded nut. This bracket is drilled to provide an oil passage and is connected by a short metallic hose to another fixture, located just below the operating shaft on the vertical center line of the brake.

Fig. 2

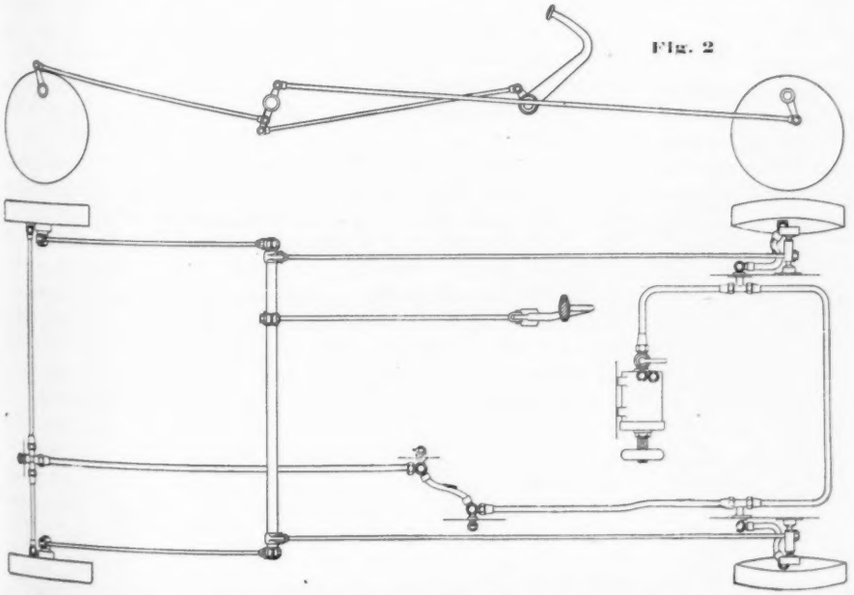
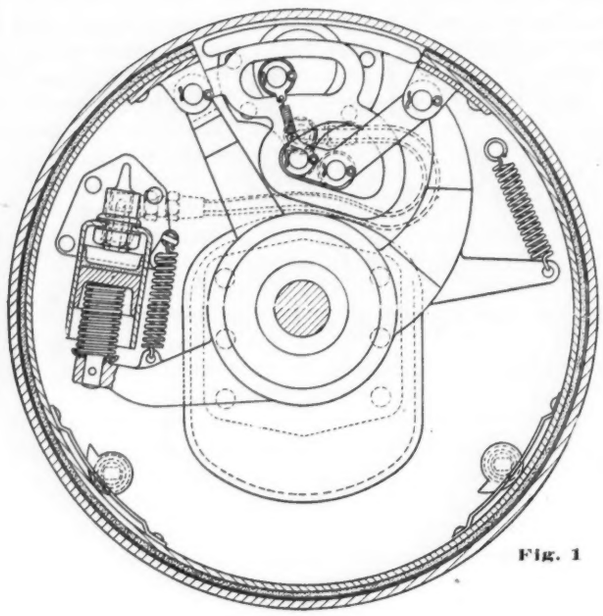


Fig. 2—Simple mechanical system which involves but one cross shaft and no equalizers. Also arrangement of hydraulic equalizing system



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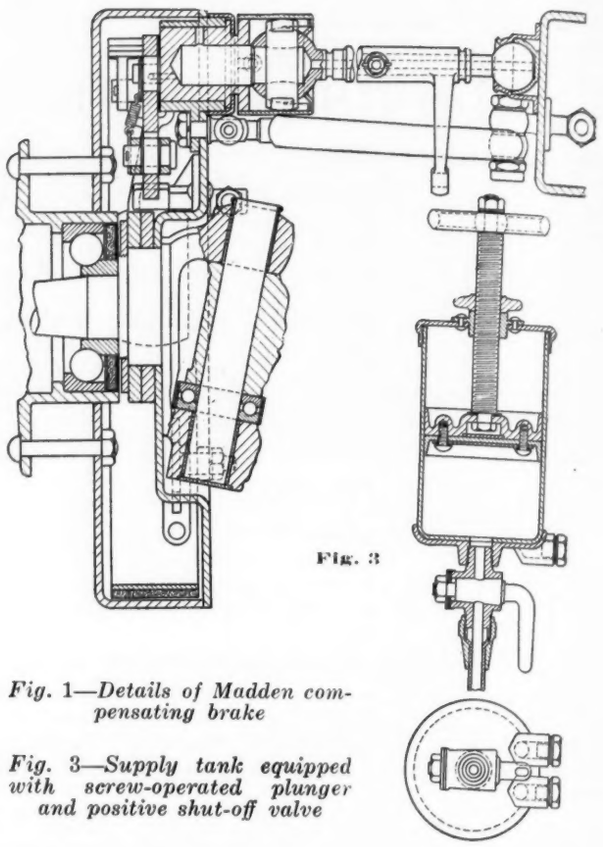


Fig. 3

Fig. 1—Details of Madden compensating brake

Fig. 3—Supply tank equipped with screw-operated plunger and positive shut-off valve

Application is effected by a cranked shaft near the top of the assembly, which is also located on the vertical center line. The offset pin on the cranked shaft carries a roller which engages with one of the slots of a special form of cam plate. The lower slot of the cam plate is wedge-shaped, with two developed surfaces which impart a toggle action to the two rollers mounted in the parallel links which are attached to the right end of the band. In this way the pin in the lever at the right serves as the bearing for the end of the operating links and the right end of the brake band, while the pin in the upper end of the bell crank serves as the bearing for the cam plate and the left end of the brake band. The pins are interchangeable, as are the three rollers which contact with the cam plate.

Operation of the front brakes is effected by the usual floating shaft, which is supported by a ball joint at the frame and incorporates a universal joint in the projected centerline of the knuckle bearing. The rear operating layout can follow any desired lines and the front may be suited to the individual design.

Mechanical Linkage Simple

In conjunction with the brakes, a typical control layout is illustrated in Fig. 2. The mechanical linkage follows the simplest lines with no equalizers at any point and no need of threaded ends for adjustment. The hydraulic system also is simple, involving interconnection of the cylinders at all four wheels and a supply tank at the dash or in the front compartment. The supply tank, Fig. 3, is a pressed steel cylinder fitted with rubber-cupped piston, which is controlled by a threaded stem and hand wheel. The location of the piston is fixed by a wing nut on the stem. A positive shut-off valve is located at the outlet of the supply tank.

In operation, depression of the pedal moves the pin on the cranked shaft in a clockwise direction. As stated previously, the spring at the right of Fig. 1 is stronger than the spring at the left, therefore the floating brake band rests in the extreme counterclockwise position. When the pin is raised, the first action is to force the left end of the band lightly against the drum, causing a tendency of the band to move with the drum and bringing the rod on the left bell crank against the piston cup in the equalizing cylinder. This cup is always in the taut position, as the spring at the end of the lower arm of the bell crank exerts an upward pressure regardless of the location of the piston pin.

Further motion of the pin on the operating shaft causes the rollers in the toggle link to move around on their developed surfaces and force the right end of the band against the drum. An important point in this connection is that the pressure on the extreme ends of the bands is very low and the real effect of the linkage occurs about 2 in. from the ends. This prevents localized high pressure with consequent chattering. As indicated by Fig. 1, the effective braking angle of the band is about 274 deg. As the right end of the band is forced outward and around the center of the axle, the entire band expands into the drum and the dragging action produces an energizing effect similar to the wrapping action of external brakes.

This same dragging action also accounts for the compensation feature of the system. The cylinders with the connecting tubing comprise a closed system which follows the law of uniform pressure in all directions. Then, if one band tends to drag with greater pressure than the other three, excess pressure will be set up in the corresponding cylinder, with consequent motion of the cup piston. The transfer of fluid moves the other pistons out and speeds up the action of the corresponding brakes until the system is in balance. In operation this action is practically instantaneous and no lag of one brake over another is discernible.

The braking action on all four wheels, therefore, is governed by the action of the wheel at which either the brake friction or the adhesion between tire and road is the least. In case one wheel is on a slippery surface, with a consequent tendency to lock at comparatively low brake pressures, the hydraulic compensation keeps the drag at the other three brakes down to the same value. The same holds true if a number of wheels are on slippery surface, and it is stated that it has been found practically impossible to lock the wheels under these

circumstances. Therefore, the steering ability is retained. The reaction between tire and road is utilized to produce equal decelerating forces at all wheels.

Where the axis of the universal joint at the outer end of the front wheel brake floating shaft is out of the plane of the king pin, the application of the adjacent brake is bound to be affected during a turn. This characteristic holds good with the mechanical portion of the Madden system, but the equalization of braking effort is maintained by the hydraulic portion. Therefore, one brake can not lock and interfere with the steering of the car. In fact, the originator of the system advocates the simplest possible mechanical hook-up, as indicated by Fig. 2.

Contours of the surfaces in the cam plate have been worked out to make the action equally effective at any band location within the range of the device, which is sufficient to allow the brake lining to wear down to 1/16-in. thickness. This characteristic leads to the elimination of all mechanical adjustment to compensate for wear of the bands. As the bands wear down, it is only necessary to unlock the piston of the supply tank and give the handwheel a few turns to force more oil into the system. If the new adjustment is too tight, the piston in the supply tank is retracted slightly and the brakes are applied lightly to force a portion of the oil back into the supply tank, after which the shut-off valve is closed.

It is claimed that the cost of this system is no greater than that of a good mechanical system and that the braking action is greatly improved. Adjustment at the plant, which involves considerable expense, can be almost entirely eliminated. As compared with machined shoes or sectors, the steel band is inexpensive. The machine operations on the supporting arms are simple, while the cam plate and toggle links can be made of stampings. The protection afforded the internal brake construction is also regarded as a considerable advantage, in that the braking action will be more nearly uniform under all weather and highway conditions which are encountered in operation.

Balloon Tires Expected to Increase Rubber Consumption

CONSUMPTION of raw rubber by the United States during 1925 is expected to reach 360,000 tons, an increase of 25,000 tons over the 1924 requirements, according to estimates of Symington & Sinclair, London, who have issued a new bulletin containing an interesting world-wide review of the rubber situation. The total world consumption in 1925 is put down at 510,000 tons. This is an excess of 35,000 tons over 1924 and exceeds by 22,000 tons the estimated total production.

Commenting on 1925 consumption in the United States, the bulletin states that the estimated increase over 1924 is based mainly on a predicted "20 per cent increase in unit volume of tire sizes." Continuing, it says: "The balloon tire, which in 1924 amounted to only about 10 per cent of the total output, is likely this year to amount to 25 per cent or more, and we believe that each balloon tire represents something like 12½ per cent more wear and tear of rubber than the corresponding cord tire.

"The extra amount of rubber consumed in balloon tires is a matter of some debate, and so far there is not enough actual experience of the average life of a low-pressure tire to make any exact calculation possible. One fact, however, stands out clearly, namely, that a wearing surface of about 50 per cent greater width—6 in. against 4 in. on a medium sized tire—is presented to the roadway by a balloon tire as compared with the ordinary cord. It is probably fair to assume that a car equipped with balloon tires will consume from 10 to 15 per cent more rubber in a year than the same car doing the same mileage on cord tires."

In regard to tire production in the United States in 1925, the *India Rubber World* is quoted as estimating the total output of outer covers as 55,750,000, distributed as follows:

Replacements	41,000,000
Original equipment	13,500,000
Export	1,250,000

Symington & Sinclair, however, place the production even higher than this, stating: "We estimate that an increase in production of approximately 750,000 motor vehicles in the United States will be shown in 1925 over 1924. Such an increase, if it takes place, would mean that about three and a half million more tires would be required than the above estimate provides for."

In 1924 it is estimated that 50,000,000 outer covers were produced in the United States, an increase of about 10 per cent over 1923. According to the figures of the Rubber Association of America, a total of 202,564 tons of raw rubber was used in the manufacture of outer covers, while 49,632 tons were used for inner tubes. Taking the total production of tires and tubes at 50,000,000 and 66,000,000 respectively, the average quantity of rubber per cover, or casing, is found to be 9.07 lb. and per tube 1.87 lb.

The bulletin points out that American manufacturers at the present time are carrying only about seven weeks' supply of raw rubber, and says: "It remains to be seen to what extent this hand-to-mouth policy can be carried and what will happen in the case of anything such as a dock, railway or shipping strike arising to interrupt the free flow of supplies."

In 1924, 80 per cent of the total production was taken by the United States, principally for tire manufacture. France was second in consumption, with total importations of 35,000 tons, most of this going to the Michelin interests. The United Kingdom used 27,000 tons, Germany and Austria 22,500 tons, Japan 17,000 tons, Canada 14,000 tons, Italy 8700 tons, Australia 3500 tons, Belgium and Holland 3000 tons, Scandinavia 2800 tons and other countries 6000 tons.

The principal source of supply was Malaya, which in 1924 produced 165,000 tons. Next came the Dutch East Indies, with 162,000 tons. Ceylon contributed 37,000 tons, Brazil 23,500 tons, and the remainder of the supply came from British India, British Borneo, Indo-China, Sarawak and smaller scattered producing centers.

It is interesting to note that during the past two years world consumption has been well ahead of the total raw rubber production. In 1923 consumption totaled 434,000 tons, as against production of only 382,000 tons, and last year 475,000 tons were consumed with production amounting to only 420,000 tons.

The fact that world consumption has so consistently exceeded the production, and because the failure of any prominent producing center to come through with its normal quota this year would throw the figures of supply and demand still further out of balance, the reviewers are inclined to be somewhat alarmed over future prospects.

THIS article points out the essential fundamentals of a factory-directed course of training for retail salesmen. It stresses the importance of considering all the elements of the problem—it has many—and finding out the exact results which are desired, and which may reasonably be accomplished, before putting any definite program into force.

Developing the Right Type of Retail Automotive Salesman

The Manufacturer

By Norman G. Shidle

NEARLY everybody has a bad word for the retail automobile salesman. A list of his faults and shortcomings long enough to reach from Detroit to Never-Never Land might be compiled from the comments of his critics.

The dealer is the direct employer and boss of his salesmen. The efficiency or lack of efficiency of salesmen is no new problem to him. He has been wrestling with it for a long time. Dealers in large cities who have enough salesmen in operation to constitute a "force," for several years have been working with educational courses, methods of paying salesmen, meetings, and other activities designed to improve the quality of selling.

All these things have had some effect. But they haven't made any remarkable improvement in the situation. There are a lot of darned good salesmen selling automobiles today. And still there are a lot of very poor ones.

Now the manufacturer is beginning to take a hand. He feels the need for better retail selling every year as competition grows keener. He sees that his dealers haven't been able to lick the problem despite energetic efforts in some cases. The manufacturer has decided to do something about it.

What is he going to do? That is the important question.

Dealers, salesmen, distributors—everybody will welcome constructive assistance, but the work must be carefully planned if it is not to be simply an abortive, money-consuming experiment which adds to marketing costs more than it brings in the way of results.

To assure sound development of factory efforts to improve retail salesmen, a few guiding principles might well be observed:

1. Lay out the general objectives and fundamental principles of operation before putting into execution any part of the program.

2. Recognize the fact that the salesman's actions are governed by his mind and his emotions; that if the latter are influenced properly the former will take care of themselves; that methods and information are valuable only insofar as they are put into operation.

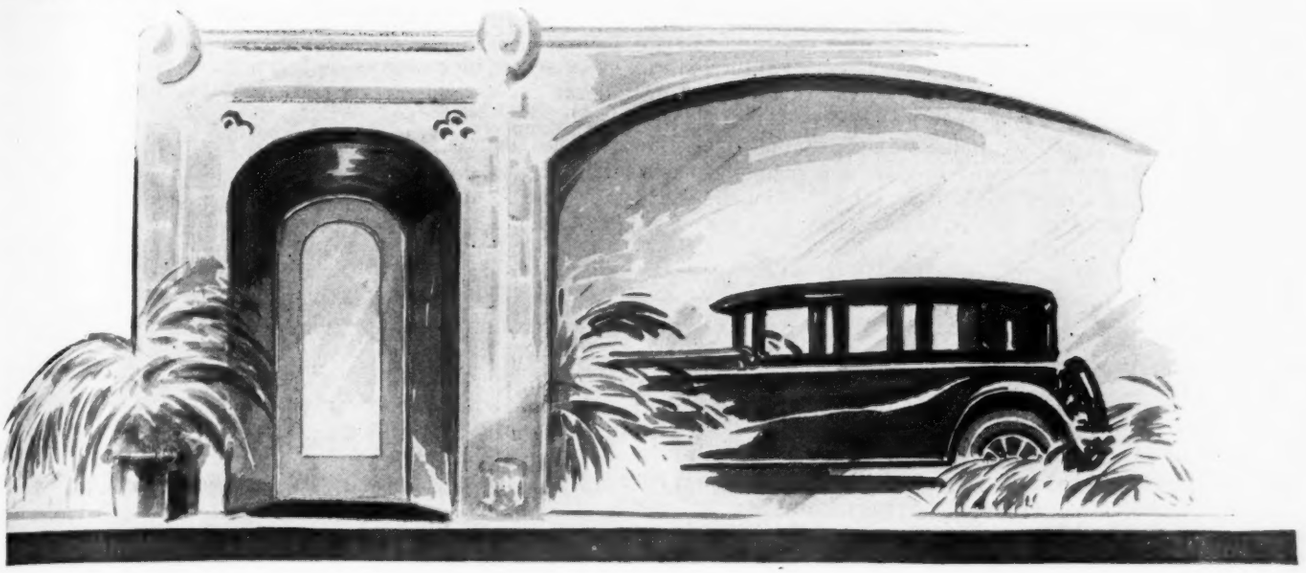
3. Find out what pedagogical methods have been applied successfully in similar work in older lines of industry. Don't pay for the cost of repeating experimental work already done.

4. Build steadily and soundly, trying to make sure of the practical value of each phase of the work undertaken as it goes along. Educating salesmen, like any other kind of education, needs constant, steady effort. It should be viewed as a five-year job of consistent effort, gaining momentum as it goes rather than as a one-year job of desk-pounding and brass band activity.

5. Recognize the fact that education of salesmen from the standpoint of the manufacturer is as much one of creating a different and more serious attitude toward automobile selling as it is of implanting specific information in the minds of particular salesman now on the force.

The Approach to the Problem

There is some danger that factory education of retail salesmen will be approached as were some other phases of dealer education and as was welfare work a few years ago. There was courage to "do something" and the doing



Must Take a Hand in His Education

too often preceded any definite determination of what the something was to be.

No manufacturer would think of telling his production manager to go ahead and build a car on the basis of a few hastily sketched outlines, but industrial relations plans and educational work have been sent forward on that basis in more than one automotive plant.

The first thing is to determine just what factory education of dealer salesmen reasonably may be expected to accomplish. The specific objectives will differ with various factories of course, depending on the size of the dealer organization, the amount of money to be spent in the educational work, the personnel available for use in carrying out the activities, etc.

In every instance, however, whether the effort is to be large or small, one objective should be to create a new mental approach to automobile selling among salesmen.

Automobile salesmen are made of the same clay as shoe salesmen, typewriter salesmen and vacuum cleaner salesmen. Their differences from men in these other lines are chiefly the result of the environment and psychology which has grown up around automobile merchandising. The automobile "game" attracted a group of men and bred an approach to car selling that is absent in those lines which, for many years at least, have been viewed as "businesses."

Selling automobiles is no longer a game. It is a business in every sense of the word. The only trouble is that a good many retail salesmen don't know it yet. To help them to recognition of that fact may well be one objective of every factory attempting education of retail salesmen. If it can become a common objective a change in psychology can be effected much more rapidly than if only a few companies here and there promote the idea.

Show the Salesman a Future

Then the salesman must be approached from an individual and personal angle. Some means must be devised to show him how his personal future and ultimate development hooks up to his sales work. This can't be done by promulgation of a lot of copy book maxims about loyalty, earnestness and honesty. It can't be done by direct preachment at all. It may be done by the example method. But it will have to be done, irrespective of the means, if the educational effort is going to be worth anything at all.

The salesman's mental attitude and emotions as related to his personal progress have to be influenced. An attempt simply to pour information into him is almost bound to fail. The correspondence schools have built their entire success on having inspired ambition and desire for progress in the minds of many young men.

The aim of the automobile manufacturer is not to make the salesman buy a course, but to make him sincerely interested in his work of selling. The objective is different than that of the correspondence school but the underlying psychology is the same.

Working for Himself

Inspire the man to work for himself—then the results of the work come almost automatically. The big problem is to arouse the man's mind; to make him think; to interest him in his job. Supplying him with information is only secondary. Too often in dealer education work the secondary phase has been given primary attention. Psychological principles have been inverted—and results have been correspondingly meager. To get the salesman intelligently interested in his work, then, may well be a second general objective of every factory effort in educating dealer salesmen.

Finally comes the supplying of information. Little need be said on this score, since nearly every sales promotion plan in operation involves a series of lessons or pamphlets on the car, how it runs, what its distinctive features are and how to answer the usual questions or criticisms likely to come from prospects. All this is helpful material, but too often it is sowed on ground but ill prepared to receive it. Informative material handed to the average salesman doesn't accomplish very much because he hasn't sufficient incentive nor initiative to really absorb it, let alone put it into active use. The field should be ploughed before it is sown.

Factory plans must involve, above all else, sound psychological principles or a lot of money is certain to be wasted. Assuming that the work is designed to make a permanent improvement in conditions, it must be given time enough to accomplish its purpose. And it should be based on the same theory that governs all progressive edu-

cational work today—namely to teach men *how* to think rather than to teach them *what* to think. A bright parrot rigged out in a dress suit might sell some automobiles, but it never could be a producer equal to the thinking being equipped with a mental self-starter.

Mapping out of these fundamentals as applied to the particular factory plan should precede and form the basis of determination of methods and actual educational activities. The actual work to be undertaken must differ to meet the needs of particular organizations. Three main types of effort comprise a major part of those activities so far under way or previously attempted. These are:

1. Factory sales schools.
2. Correspondence courses or series of bulletins.
3. Personal work by traveling men representing the factory.

The factory sales school is not so popular today as it was a few years ago, either for training dealer salesmen or for training other kinds of territorial representatives. Such schools have been utilized successfully by certain companies both in the automotive and other lines of business, but probably it can be said safely that the failures have outnumbered the successes by a considerable margin. That fact in itself is no overwhelming argument against the factory sales school, because failures are almost certain to be numerous in any activity of an experimental nature. The difficulties may accrue from the operation of the method rather than from any inherent fallacy in the method itself.

Points For and Against

The points for and against the factory sales school may be summed up somewhat as follows:

For

1. It gives the salesman a practical and intimate knowledge of the product and company policies which cannot be put over by mail however effectively the latter is handled.
2. It gives the salesman a feeling of personal relationship with the particular product and factory which helps keep up his enthusiasm and which tends to hold him with the particular organization longer than he otherwise would remain.
3. It provides key salesmen in various communities who will spread the factory spirit and policies from first hand knowledge and thus influence other salesmen with whom they associate.
4. It concentrates within a relatively short period as much training as could be given at long range in several times the time.

Against

1. The cost of training per salesman is very high.
2. There is no assurance that the man so trained will not go to a competitor or leave the industry shortly after this money has been invested in his education.
3. Relatively few men can be trained in this way; the entire dealer salesforce never can be reached.
4. The number of men actually trained is too small to have much effect in influencing the salesforce as a whole.

Traveling Factory Instructors

Some men who have studied the problem think that the sales school should be used to train factory traveling men or distributer traveling men, with the idea of making these representatives better able to help the dealer in the solution of his general problems and to help make better retail salesmen. From many points of view this would seem to be the most efficient use of the factory sales school.

A series of bulletins or a regularly outlined correspondence course and the methods most commonly used in educating dealer salesmen. To be of any real value such bulletins, of course, must be regular in their appearance and logically worked out as to sequence and purpose. No better model than the correspondence school is available for molding the general aspects of such work.

This correspondence work is bound to form an important part of any factory educational activity because it is the cheapest method of reaching a large number of salesmen. Its effectiveness depends almost entirely on the editorial ability of the man who prepares the material. All the information in the world won't do any good unless it is presented in a form which will attract and interest the salesmen for whom it is intended.

Only the larger organizations are likely to find it feasible to provide factory traveling men whose sole function is that of dealer education. Travelers have a large number of advantages, but involve relatively heavy expense just as the factory sales school does. As a matter of fact, the factory traveling man whose duty is that of dealer education performs about the same function as the factory sales school; in one case the salesman is brought to the educational source, in the other the education is taken to the salesman. Transportation costs in either case have to be considered carefully.

Planning the broad outlines of salesman training work before beginning is almost certain to develop the fact that any course of instruction based purely on the information-dispersing plan will run out of ammunition in about 12 months. The spirit of the factory, its equipment, the merits of the car as a whole, of each of its parts separately, the chief selling points and a few fundamentals of sound salesmanship pretty nearly cover the scope of the purely informational service. That's the reason the work needs a broader basis.

Every dealer knows that there always is something to talk to his salesmen about. They never seem to become perfect, however, often he tries to help them. They always need help. Frequently it is about some small point of selling, of approaching a prospect or of handling a particularly tough trade-in. The aid given proceeds largely through the question and answer method.

Thinking About His Work

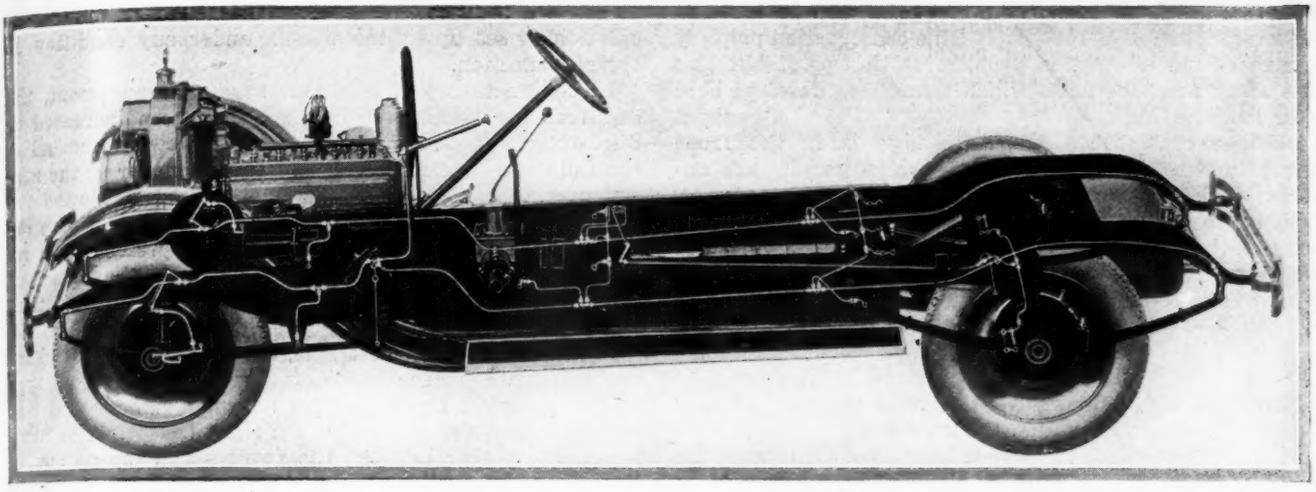
The factory educational work may well make use of the same method. If the factory can get salesmen interested enough in the material it is sending out to make them write in and ask for more help, it has accomplished one of the main purposes of its work—it has stimulated the salesman to think about his work.

When a salesman asks a factory how to meet a certain problem, he has indicated by so doing, two things:

1. His confidence in the ability of the factory to help him.
2. Sufficient interest in his work to have visualized clearly at least one of his problems.

On the requests for additional help, the factory may well base its judgment of the success of its attempts to educate dealer salesmen. Almost anybody will write a letter of glowing tribute, whether he really has got anything out of the course of instruction or not. Real thought isn't necessary in the writing of testimonials. But few people will take the trouble to sit down and write for more information unless they already are interested in what has gone before.

To stimulate thought on the part of the salesman is the most important task that factory educational work can accomplish.



Single Six Packard chassis showing application of the Bijur lubricating system; also the new front spring layout with the shackles at the front

Spring Layout of Packard Changed; "Six" Engine Enlarged

Front springs on both six and eight cylinder models are shackled at front and anchored at rear. Bore of Single Six increased. Many other refinements made.

PACKARD Motor Car Co. has introduced a number of refinements in both its six and eight cylinder models in addition to having made the Skinner oil rectifier and the Bijur chassis lubrication system standard equipment. Important among the changes is an unconventional front spring layout in which the shackles are located at the front and the anchors at the rear. Brief announcement of these improvements was made in AUTOMOTIVE INDUSTRIES of March 5.

Detail changes have been made in practically every unit of the two models. Improvements have been made in the clutch and universal joint construction. The engine oiling system has been refined, the valve mechanism has been the subject of detail improvements, and counterbalances have been placed on the crankshafts. The bore of the Single Six engine has been increased from 3⅜ to 3½ in. No changes have been made in the prices although complete accessory equipment, balloon tires and disk wheels now are furnished on all models.

A total of 45 points are lubricated by the Bijur system. Outside of these, which are listed below, practically the only points on the chassis which require anything like periodic lubrication are the brake anchors, front axle king pins and the universal joints and all of these are fitted with reservoirs of ample capacity:

Name of Parts Lubricated	*No. of Points*
Front axle brake equalizing lever shaft	4
Front axle brake operating shaft	8
Front spring bolts	6
Hand brake intermediate lever shaft	2
Hand brake operating shaft	4
Hand brake lever shaft	1
Rear axle brake equalizer lever shaft	3
Rear axle brake operating shaft	4
Rear axle spring bolts	6
Rear axle torque arm—rear end	2
Steering connecting rod ball joint	2
Steering sector shaft	1
Steering cross tube ball joint	2
Total	45

Lubrication a Simple Matter

All these points can be lubricated when the car is in motion or at the curb by merely pulling back the plunger of the hand pump and then releasing it. The Bijur system was described in detail in AUTOMOTIVE INDUSTRIES of Feb. 12, 1925, and its application to the Packard car is shown in one of the accompanying illustrations. In both models, it is an inherent part of the design, bosses and oil passages having been worked out to give simplicity and proper metering effect at the various bearings.

Changes in the universal joints make lubrication at these points necessary less frequently. Oil is used as the lubricant in the new joints which are of the usual cross pin construction, but all of the bearings are inclosed in an annular pressed steel housing of substantially square section. Rotation induces flow of oil through the cross pin bearings while leakage, which necessitated splash guards at these points formerly, is eliminated by housings which are intrinsic parts of the joints. As the annular housings are of rather liberal capacity, lubrication of these joints is required less frequently.

In place of the former metallic joint at the front end of the torque arm, a fabric construction has been substituted. Two pressed steel brackets extend downward from the center cross member and between them a strip of rubberized fabric is clamped at the upper and lower ends, while

a pad on the front end of the torque arm is fastened to the middle portion of the strip. This construction not only eliminates the lubrication problem at this point but also does away with the noise which sometimes develops here after long service.

Another outstanding chassis change is in the front spring layout. Where the front springs usually are anchored at the front and shackled at the rear, this arrangement has been reversed and the springs have been underslung on the axle. The drop center rear axle used formerly has been displaced by one which is slightly V-shaped as viewed from the front, the angle of the V being about 165 deg.

Torque Characteristics Improved

Elimination of shimmy is the chief purpose of this change although the torque characteristics in conjunction with the front brakes have been improved. Although the former springs were nearly flat under load, any deflection tended to move the axle about the front spring anchors, as centers, in an arc which was opposite to that traversed by the front end of the drag link about its center in the ball on the lower end of the steering gear arm. At the high and low points of these arcs, an appreciable distance separated them and, as the drag link is attached to the chassis at the rear end, the axle moved forward and backward with respect to its front end. Consequently, a wobbling or shimmying action was transmitted to the cross link and wheels.

With the front springs now anchored at the rear end and underslung at the axle, the paths of travel of the axle and the front end of the drag link about the rear spring eye and the ball on the steering gear arm, respectively, are practically identical. Therefore, no tendency toward oscillation is set up at the wheels under any condition of spring deflection.

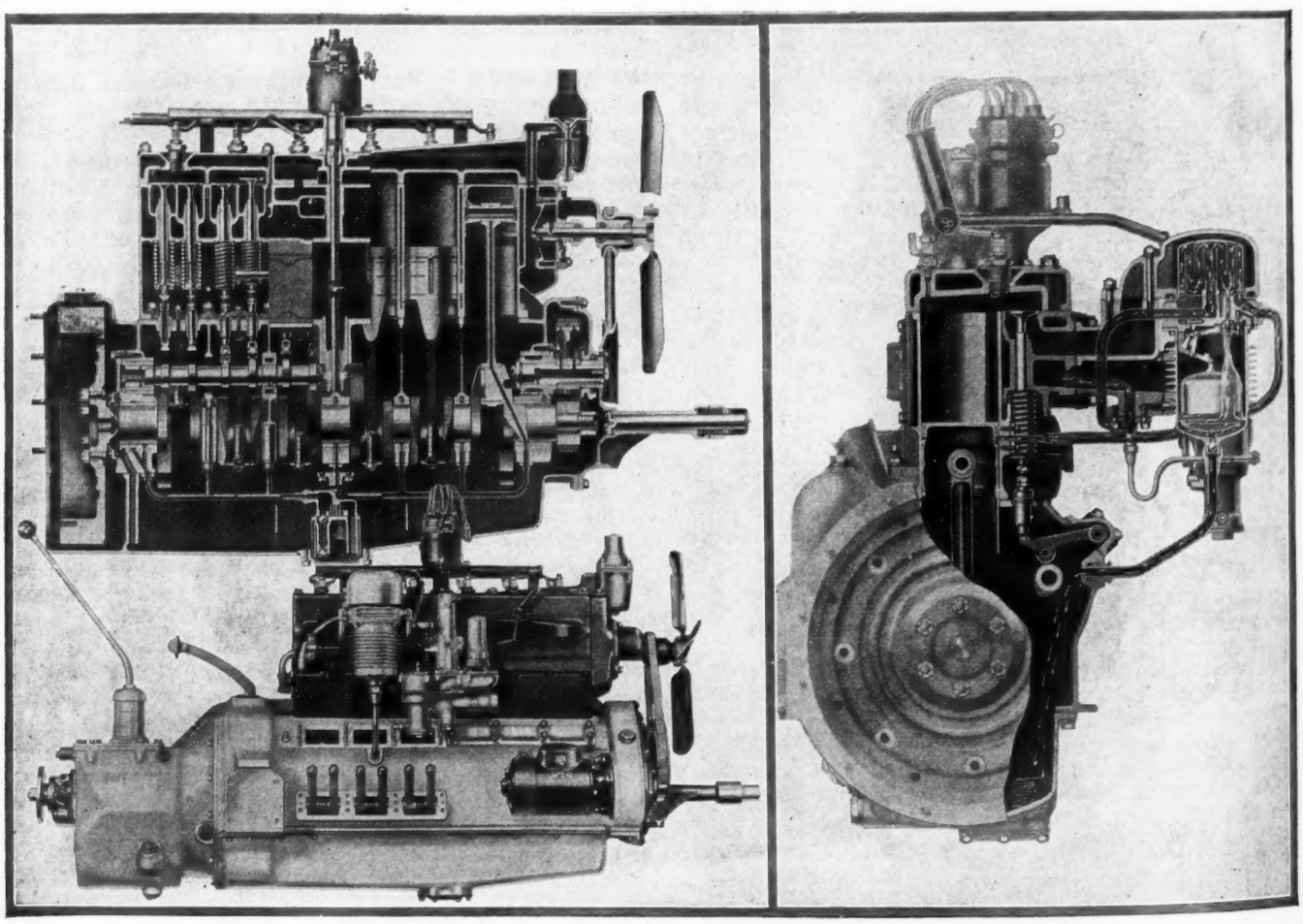
In conjunction with the new spring arrangement, the depth of the frame side channels has been increased to 8 in. on both models. Appearance is somewhat unusual as the full depth is carried forward to the anchor at the rear end of the front springs. From this point forward the lower flange is swept up over the axle and blends with the spring horn at the front end. A heavy pressed steel reinforcing piece is riveted into the channels above each of the front spring anchors. Side members are 5/32 in. thick.

At the rear end of the frame, the characteristic Packard spring horn has been supplanted by the more usual type as bumper pads are forged on all spring horns and this change brings the bumper at the right height. The tubular cross member between the front spring horns now is attached at each end by four rivets instead of the former two. Also the rear motor supports are equipped with four bolts instead of two as in the earlier cars.

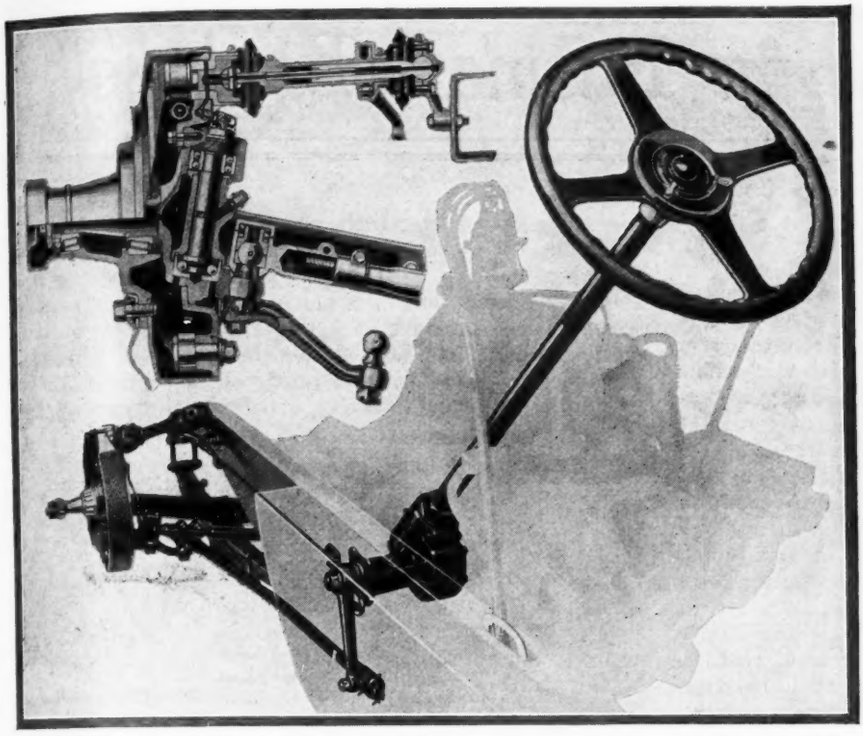
The Skinner oil rectifier is carried on the exhaust manifold just aft of the carbureter and fuelizer. It is supported by a cast aluminum cap which forms the exhaust chamber around the vaporizer at the upper end of the rectifier. Performance has been improved by making the lower or accumulation chamber of cast aluminum with liberal air cooling fins on the outside.

Pistons Are Redesigned

A manifold extending the length of the engine inside of the valve spring chamber is connected to each cylinder barrel and at the rear end of the block has a copper tube



Left—Sectional view of Packard Single Six engine and, below, right side view showing rectifier installation. Right—The oil rectifier in section; also the new roller followers on the tappet levers



Above—Section of Packard steering knuckle construction. Note the oil passage in the brake operating shaft. Below—The layout of the steering system

connection to the back of the rectifier. Pistons have been redesigned to provide continuous drainage into the rectifier from the cylinder walls. A long lip extends downward on the piston skirt on the side in contact with the opening to the rectifier manifold. A vertical channel is cut in the skirt to provide a constant opening at the manifold connection. This channel extends up to the lower ring groove and a vent hole is drilled at the opposite side of the latter groove. The operation of the rectifier itself has been described in detail in these columns previously. In test runs of over 25,000 miles with both six and eight cylinder chassis, average oil consumption was 1650 miles per gallon and dilution averaged about 3 per cent.

In earlier engines, a copper tube connected the piston pin bearing with the lower rod bearing to allow oil under pressure to be fed to the pin bearing. In the revised engines, this tube is eliminated and a small hole is rifle-drilled in the web of the rod for this purpose, the section of the web being increased at the middle to accommodate this passage. The pin floats in both rod and piston, being retained endwise by snap rings. The bronze bearing at the upper end of the rod is finished with a diamond pointed tool and with the exception of the surfaces of the webs, the rods are finished all over. The lower bearing is babbitted in.

Size of Bearings Changed

In the Single Six engine, the crankshaft bearings have been made the same diameter as those of the Eight, the main bearings being 2⅜ and the crankpins 2⅛ in. in diameter. Neither shaft is drilled out as formerly, except for the oil leads from the main to the crankpin bearings. Therefore, the shafts are considerably heavier. Counterweights of a unique nature have been placed at the end and center bearings of both engines and the vibration dampener, although heavier, is continued in the eight. These counterweights, which will be discussed in detail in an early issue, have been evolved by an extended mathematical analysis and have produced a new standard of smoothness of operation.

In the valve mechanism, the former shoe tappet has been replaced by a roller at the outer end of the tappet lever. In milling out the fork for the roller, the shank of the tappet lever also is reduced to a channel section and therefore is very light. Above the tappets, the valve spring anchors have been changed from the C-type to the slot and cross pin. Camshafts have been made somewhat larger and are carried in bearings at each of the webs of the crankcase, nine in the Eight and seven in the smaller engine. The camshaft is rifle drilled and this hole forms the oil supply channel for all bearings ahead of the rear which receives its oil from the rear main bearing. A slight change at this point has insured continuous instead of rapidly intermittent flow and has resulted in greater silence of operation. For the same reason, oil pump gears now are made slightly helical and with an improved tooth form which prevents trapping in the spaces between adjacent teeth. The timing chain drive on both models is interchangeable.

For the fan drive a one-piece rubber belt has been substituted for the former built-up leather construction. In the Six engine additional weight has been added to the rim of the flywheel.

On both models, the dry plate multiple disk clutches are continued, although the construction of the outer member or housing has been modified to eliminate dirt which ordinarily collects in units of this type and thereby improve the clutch action. Channels are turned in the periphery of the housing to such a depth that the roots of the internal gear teeth are exposed, leaving many rectangular openings for dust and dirt from the disks to emerge.

Gearshifting has been improved by decreasing the weight of the transmission gears. These gears are finished all over and the teeth are ground. A number of holes are drilled in the webs of the larger gears and these decrease weight, spinning effect and resonance to a considerable degree.

The length of the rear springs on the Six has been increased two inches and substantial rubber bumpers are attached to the frame at each of the four points of possible interference.

Externally, the appearance of the cars has been modified only slightly by the increased depth of the flanges on the fenders and the absence of screw heads at the moldings at the edges of the running boards. Disk wheels and 32 x 5.77 in. low pressure tires are standard equipment on all cars. The spare wheel and tire cover are standard equipment and the bracket for the spare now is pressed steel.

The drag link is a one-piece construction with no adjustment and the ball joints are improved. The gas tank on the Six has been increased to 21 gal. capacity and the vacuum tank also has greater capacity. All body models have gasoline gage on the dash and the fillers at the tanks have been made more convenient. The characteristic Packard bezel has been removed from the nickel headlamps which now have plain rings.

No changes have been made in body types. The steering wheels on both models are identical, both rim and spokes being polished American walnut. The strap door checks in the closed bodies have been supplanted by metallic checks concealed at the tops of the doors.

Books for the Business Bookshelf

Sales Personality

ALL other things being equal, the salesman with the most telling personality has an edge on his competitors when the time comes to get the customer's signature on the dotted line. This is a fact which might prove very discouraging to a salesman, or a prospective salesman, who did not happen to be naturally gifted with the personal charm and magnetism which combine to form the elusive element we call "personality." However, there is hope; for this personality, or more particularly, sales personality, is something which can be acquired, according to Elmer E. Ferris, professor of salesmanship at New York University, who treats the subject entertainingly in the second edition of a work entitled "Developing Sales Personality," from the press of Prentice-Hall, Inc., New York. This edition is somewhat more comprehensive than the first, in that a new element, personal contact, has been introduced. The three elements previously considered as comprising the groundwork of a successful sales personality were: Affirmative mental attitude, vital energy and intellectuality.

Mr. Ferris outlines numerous rules and suggests courses of study to be followed by his readers. He also cites specific cases in which the personality of the salesman has accounted for his success. It is pointed out that, in view of present merchandising conditions, the salesman is constantly becoming a more important factor in business. In most industries, Mr. Ferris says, the machinery for production has been developed to the point where it exceeds the normal demand. Competition consequently has grown correspondingly keen. The manufacturer, generally speaking, has disposed of the production problem, but his selling problem has become more complicated and its solution lies in better salesmanship.

A German Yearbook

A YEARBOOK published by the German Automobile Manufacturers Association contains a good deal of statistical material together with a review of the situation on the German automobile industry in 1924 and articles on numerous technical problems of automobile design and manufacture. The book was issued under the joint editorship of Dr. Curt Sperling, general manager of the association, and Dr. Ernst Valentin. Among the technical articles contained in the volume may be mentioned the following: Fuel Feed in Motor Vehicles, Motor Car Tests, Objectives in the Design of Carbureters, Use of Light Alloys in the Manufacture of Automobiles, Standardization in Automobile Manufacture, Materials of Construction for Automobiles, Wheels and Tires, Electric Trucks, Electrical Equipment, and Heavy Oil Engines for Motor Vehicles. The book is well edited and printed and is a credit to the association that issued it.

Automotive Electricity

A NEW text on Automotive Electricity has been prepared by Earl I. Consoliver, director of the School of Automotive Electricity, Inc., a division of the School of Engineering of Milwaukee, and is published by the McGraw-Hill Book Co. of New York. The book deals with the elements of electrical phenomena and explains the principles of the various electrical devices used on modern cars, besides giving details of many systems of electrical equipment for automobiles now on the market. The work was prepared to serve as a text in the training of automotive electricians, to deal in detail with the principles, construction, operation and repair of the different makes of ignition, lighting, starting and other electrical apparatus used on automotive vehicles.

Presenting Statistics

STATISTICS are the tools of the modern business executive. If the automotive manufacturer, for instance, desires to compare yearly production figures he is almost sure to do so by means of a chart. If he wants a quick, accurate line on the trend in pig iron he consults a chart. If he wants a picture of the unemployment situation, general commodity prices, business conditions in any given area, or exports over any stated period, then again he is likely to have recourse to charts. At any rate, what he wants to guide him in the conduct of his affairs are statistics—terse, crisp lines and figures, whether in tabular or chart form. It is so in all business today.

Recognizing this fact, Robert Riegel, Ph.D., professor of insurance statistics in the Wharton School of Finance and Commerce, University of Pennsylvania, has devoted himself to an exhaustive study of the science of accumulating and presenting figures of every kind and has recently issued an interesting volume on the subject entitled "Elements of Business Statistics," published by D. Appleton & Co. The book is practical and comprehensive. It begins with the development and fundamental principles of statistics, sets forth the various purposes statistics can serve, takes up the types of facts with which the statistician deals, shows the best methods of graphic presentation in charts and diagrams, and describes how to collect and tabulate statistical facts. The last chapters deal with the interpretation of facts by statisical methods and the drawing of general conclusions therefrom. The book should be of considerable value to anyone interested in the presentation or interpretation of statistics.

Studying the Automobile

A BOOK that should prove popular with automotive students, mechanics, owners and salesmen has made its appearance under the title of "Automotive Construction and Operation." The authors, J. C. Wright and F. C. Smith, have succeeded in producing a work that is at once interesting and instructive, and the ground is extremely well covered. The first chapter sums up the progress in automobile design from the building of the first vehicle to the present time. This is followed by descriptions of the various types of automobiles now in use. There are chapters on engines, gasoline, carburetion and fuel supply, lubrication, cooling systems, starting systems, magneto systems, ignition, batteries, lighting, etc. Maintenance has not been neglected as there is a section of useful information on this subject. Many illustrations are used to supplement the text. John Wiley & Sons, Inc., New York, is the publisher.

Here and There in Foreign Markets

By special arrangement with the Automotive Division, Bureau of Foreign and Domestic Commerce

In South America

TRANSPORTATION in South America continues a problem of great magnitude. The figures for 1924 indicate a general trend upward as far as the automotive industry is concerned. Brazil with an increase of 35 per cent leads the march, with Uruguay, Argentina and Peru all above the 25 per cent increase mark. So far for 1925 the figures indicate that this year an even greater gain will be shown.

While the meeting of the International Highways Commission will not be held until late in October, perhaps too late to have any material effect on the year's business, the fact that Rio de Janeiro has just passed a bill for the expenditure of 11,150,000 milreis for improvements in the roads within and leading to it shows activity in this section. The formation of a private trucking corporation to handle freight by motor trucks between Santos and Sao Paulo is also announced. This company will start with an initial fleet of ten 5-ton trucks, increasing the number as business warrants. With the move for better roads the subject of motor transportation from all angles is assuming greater proportions as the topic of intercontinental and international commerce is considered. The formation of this company should prove a forerunner of others as conditions improve.

Philippine Demand Holding Up

PHILIPPINE automotive sales during the first quarter of 1925 have equaled expectations. Increased business during the first six weeks was particularly noticeable, although late February and March showed reactionary signs. Sales are now steady, and although the developments of the next three months may not repeat the spectacular features of January, a good aggregate turnover is anticipated. Dealers estimate that total sales have numbered about 600 during the quarter. Interest in trucks is also more lively, and a somewhat stimulated demand for machines in the weight class above 2 tons has appeared.

Spanish Car Discontinued

THE Spanish company "David," maker of the David cycle cars, which have had considerable vogue in and about Barcelona for use as taxicabs, is definitely giving up the business of making these cars. The factory in Barcelona, which has not been operating for some months will be converted into a repair plant for all kinds of cars. About 350 David cycle cars in operation in Barcelona are being replaced with Citroens.

Time Sales in Spain

TWO developments of interest in the Spanish market include the first use of credit by dealers accepting guaranteed paper and an increasing number of trade-ins of used cars. The former has resulted in an increased number of cars in circulation, which are not yet paid for, and dealers' credits consequently have been stretched rather far. Probably 50 per cent of the total sales now involve trade-ins, and large stocks of secondhand cars are now on the market. A promising market for 2-ton truck chassis for omnibus service has been opened by a royal decree providing for mail and passenger route concessions. European makes may secure the lion's share of this business, owing chiefly to insufficient representation of American trucks and lack of spare parts and servicing facilities. The establishment of truck branches by leading European manufacturers, permitting easier credits, immediate deliveries, and excellent spare-part service, is having a noticeable effect. American cars selling at over 10,000 pesetas are increasingly popular and withstanding competition very well, but light cars under that figure are not holding up so well. A large number of European cars have recently been put into taxicab service in Madrid and Barcelona.

Cars Increasing in Austria

IN connection with a bill for a new automobile law in Austria there have been published the following figures regarding the growth of automobile registrations in that country:

Date	*June* 30, 1922	*June* 30, 1923	*June* 30, 1924
Pass. cars	8223	9392	9496
Trucks	3506	3864	4461
Motorcycles	3474	6171	8978

Registrations in Hungary

ACCORDING to a census taken on Dec. 31, 1924, there were 6255 motor vehicles in Hungary. Of these, four-fifths were in Budapest, the capital. The vehicles include 4027 passenger cars, 968 motor trucks, 31 motor buses, 970 motorcycles and 259 other vehicles.

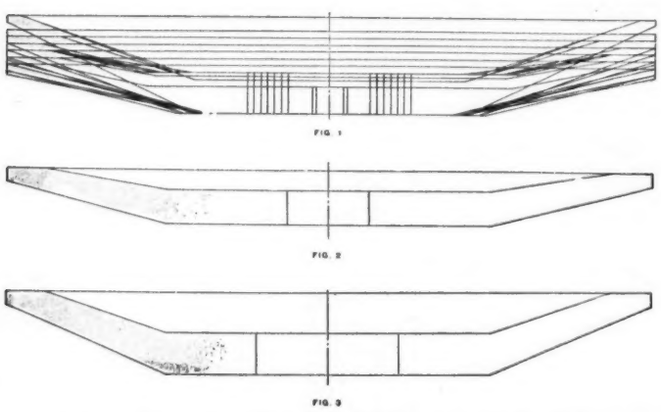
Grinding Wheel Manufacturers Simplify Products

General types of wheels reduced from 29 to 14 and number of sizes of each type limited to minimum which will meet needs of grinding industry. Work has been in process since 1920.

THE Grinding Wheel Manufacturers Association of the United States and Canada, after working for five years in the endeavor to reduce the multitude of existing grinding wheel shapes and sizes to a reasonable number of practical standards, has prepared a booklet on the "Standardization and Simplification of Grinding Wheels," containing the results of its work in the form of tables listing the adopted standard shapes and sizes for the various classes of work.

This booklet is now being submitted to the designers and builders of grinding machines and attachments, as well as to users of grinding wheels, as the association realizes that it is only with their cooperation that such a movement can attain success.

This movement toward standardization was first started nearly ten years ago, the results of the earlier endeavors having been presented in the form of a pamphlet issued in 1916, which, however, received scant recognition. This was, no doubt, due to the fact that industry in general at that time had not recognized the potential value of such work. A few years later interest in standardization began to grow rapidly, aided by the helpful attitude of the Government. A new committee was accordingly appointed in 1920 for the purpose of revising and extending the work previously done in the grinding wheel industry, the general aim being the formulation of acceptable standards.



Diagrams show methods employed in standardizing and simplifying grinding wheel types and sizes

The first action was to make a careful survey to ascertain the progress of standardization in other industries. This investigation showed that in the interval of five years much had been accomplished. In the case of grinding wheels, however, many difficulties arose, due to the extreme variety of existing types of grinding machine equipment, and each type had to be studied with great care.

Due consideration was given not only to the machine equipment but to the demand for, service rendered by, composition, shape, manufacture and use of, each type of wheel.

An investigation of the general phases of the problem of wheel standardization led to the conclusion that the ultimate goal should be reduction of the number of wheel shapes and sizes to the minimum which would answer the requirements of present grinding practice and furnish a sound basis for future development. In engineering practice widely diversified methods are often used to accomplish identical results. In the abrasive field, for instance, there are numberless variations which reflect only the different points of view in approaching a specific problem. The many variations in size, shape and arbor hole have very little bearing on the basic engineering principles involved. Thousands of wheel shapes have been developed simply because the industry as a whole had never taken steps to establish standards for the guidance of designers, machine builders and users, but accepted without question wheel designs as ordered.

Rapid Growth Caused Confusion

There were several reasons for this condition. Among the foremost was the rapid development of grinding machines which opened new fields for the application and use of grinding wheels. A further cause was lack of cooperation between the machine designer and grinding wheel manufacturer and also a lack of standarization within the ranks of the machine builders themselves.

All of these factors tended to increase the diversity of shapes and sizes and created a condition which was so complicated that it was felt by the wheel manufacturers, machine builders and users alike, because adequate stocks of so great a variety of grinding wheels could not be economically carried. Under normal conditions it requires from six to eight weeks to process wheels, and delays due to inadequate stocks often seriously embarrass the user. The plan followed in reducing the number of sizes to a minimum is interesting and quickly showed where enormous savings could be made.

A complete list of existing sizes of each given type of wheel was compiled. These various wheels were checked against each other by a layout plan where sizes of a given diameter and similar shape were drawn one over the other. Fig. 1, for example, represents a layout of a group of 6-in. dish wheels, all designed for cutter and reamer work and still so similar that any one of these could, with the proper arbor, be substituted for the other. This is indicative of all types of tool room wheels and shows clearly what simplification of wheel shapes means to the industry. There were no less than twenty-two 6-in. dish wheels to consider. This number was finally reduced to the two standards shown in Figs. 2 and 3. By this method the committee could visualize quickly the differences in dimensions and shapes. By the elimination of inactive sizes (arrived at from the actual sales records of a number of

manufacturers) only the popular selling sizes were left to be considered. From these a composite shape was designed, which should meet the present day machine requirements and satisfy the grinding wheel manufacturers. In this way internal wheels, dish wheels, straight wheels, flaring cups and double cups were simplified. In no case was the thickness of wheels between flanges increased in the types of wheels just mentioned. A slight change was made in some of the shapes, but not enough to interfere with the proper mounting of the wheel. The bottom corners of recesses were rounded to give additional strength.

Internal and Cylinder Types

The first type to receive attention were the internal and cylinder grinding wheels. Although these are small in size, the troubles encountered were many, because of the varying diameters controlled by the diameter of the holes to be ground, and also because of the many existing arbor holes for the various internal production machines and internal attachments. With the cooperation of the builders of internal and cylinder grinding machines, the committee after three years of work succeeded in having the present list of diameters and thicknesses approved. The following internal wheel dimensions were adopted:

Standard Diameters, ¼, ⅜, 7/16, ½, 9/16, ⅝, 11/16, ¾, 1, 1¼, 1½, 1¾, 2, 2½, 2¾, 3, 3½ and 4 in.

Standard Thicknesses, ¼, ⅜, ½, ⅝, ¾, ⅞, 1, 1¼, 1½, 1¾ and 2 in.

Arbors. The following are proposed for new installations:

Arbor	*Wheel Diameters*
⅛ in.	¼ and ⅜ in.
3/16 in.	½ and ⅝ in.
¼ in.	⅝, ¾, ⅞ and 1 in.
⅜ in.	1, 1¼, 1½, 1¾ and 2 in.
⅞ in.	2, 2½, 3, 3½ and 4 in.

The arbors as published in the present standardization booklet cover the sizes now in use. The list in this article shows the proposed standards which are recommended for ultimate adoption.

The following cylinder grinding wheels have been adopted as standard.

Diameters. 2½, 2¾, 3, 3½, 4 and 4½ in.
Thicknesses. ¾, 1 and 1¼ in.
Arbors. ⅞ and 1¼ in.
Recess. 1¾ x ¼ in. for ⅞ in. hole.
2¼ x ¼ in. for 1¼ in. hole.

The table below is a summary of the Committee's work on internal, cylinder grinding and tool room wheels showing existing sizes, reduction and possible stock saving. It is based on the lowest possible stock quantities for each type of wheel.

Results of New Policy

Internal and cylinder grinding wheels: 500 in each size in two grits and two grades.

Straight, flaring and double cups: 100 in each size in two grits and two grades.

Dish wheels: 200 in each size in two grits and two grades.

Type of Wheel	Number of Existing Shapes	Possible Stock	Reduced to	Reduced Stock	Possible Stock Saving
Internal	289	578,000	95	190,000	388,000
Cylinder	45	90,000	26	52,000	38,000
Straight cups.	11	4,400	5	2,000	2,400
Flaring cups.	27	10,800	8	3,200	6,600
Dish wheels..	38	30,400	9	7,200	23,200
Double cups..	4	1,600	1	400	1,200

Total possible stock reduction by simplification, 459,400 wheels.

Cylindrical grinding wheels were the last to be considered. Many different wheel sleeves had been designed, necessitating a large number of arbor holes and different counterbores. Close cooperation by some of the leading cylindrical grinding machine manufacturers made it possible to standardize on three arbor holes, namely 5, 8 and 12 in. At the same time it was possible to make the diameter and depth of counterbore standard for all cylindrical grinding wheels thicker than 2 in.

One other step toward standardization was to reduce the existing types of all classes of wheels from twenty-nine to fourteen.

Kodak Co. Has New Body Finish

THE Eastman Kodak Co., Rochester, N. Y., has developed a complete finishing system for automobiles which will be marketed under the name of Kodalak. The materials utilized in the new system all are furnished by the Kodak Company and consist of oil-base primer and surfacer, and Kodalak pyroxylin lacquer and thinner.

The primer comes ready for application and is sprayed on in a thin, uniform coat at about 70 lb. pressure with the ordinary type of gun. This coat is given an air-dry of 20 hr., or is force-dried for two hours at 150 deg. Fahr. The next operation is to spot putty and glaze, unthinned surfacer being used for this purpose.

The surfacer as furnished, is to be diluted with an equal amount of turpentine for the spraying operations. The first coat is air-dried for two hours. The second coat of surfacer is then sprayed on and it may be dried either overnight at room temperature or in two hours at 150 deg. Fahr.

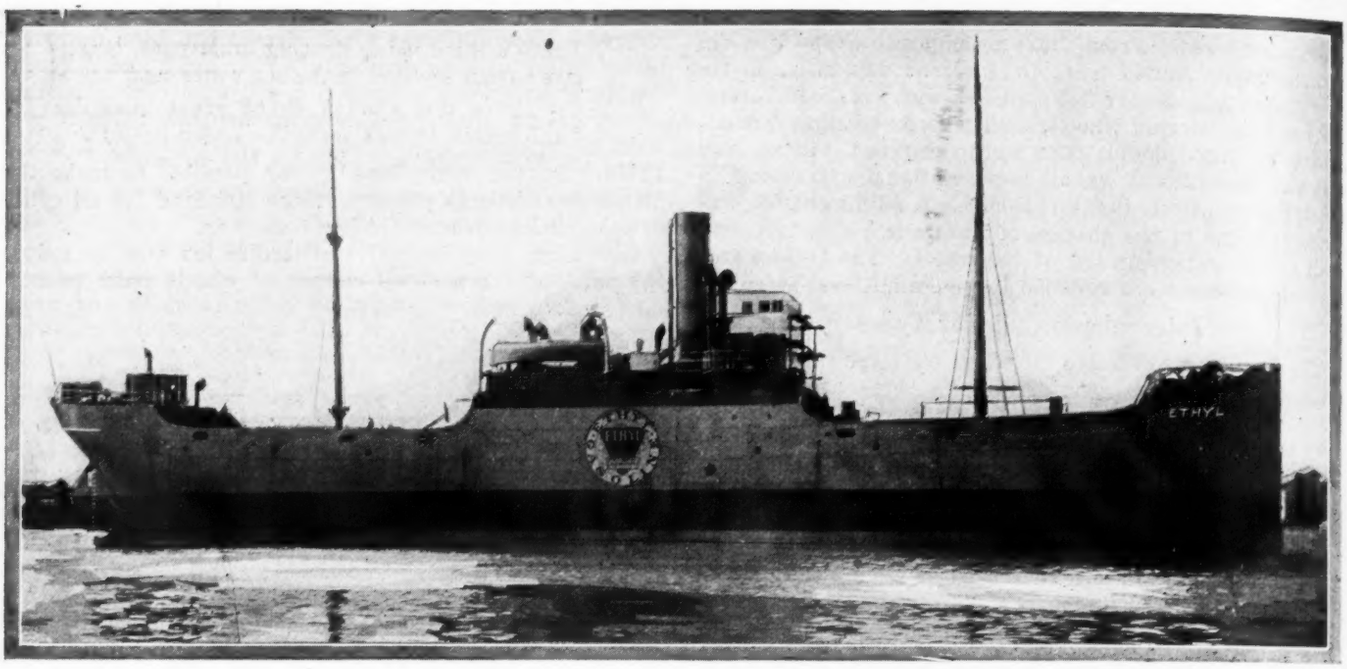
If the bodies are being received in the finishing department in good shape, the spot puttying and glazing may be done between the first and second surfacing coats. But if they are coming through in poor shape, the puttying and glazing should always precede the application of the surfacer.

Light Coat of Surfacer Is Used

After the second coat of surfacer has been applied a very light coat of surfacer colored with a little Tuscan red is spread over it. This serves as a guide coat for the subsequent rubbing. The job is then dried over night and the body wet sanded with 320 paper until a smooth, even surface is obtained. To guard against rubbing through the surfacer, the primer is made brown in color so that it will contrast with the gray of the surfacer.

Three coats of Kodalak lacquer, which has been diluted with an equal amount of Kodalak thinner, then are applied. The second and third coats are sprayed on as soon as the first and second coats, respectively, have dried to the point where they are not tacky to the touch. Ordinarily, drying will have reached this stage by the time the operator gets around the body so that the application of three coats is continuous. The lacquer is sprayed on at 70 lb. pressure but greater pressure may be used if the operator is capable of working at the resulting higher speeds. After the application of the third coat the body is air-dried over night or for two hours at 150 deg. Fahr.

The dried lacquer is then rubbed with 400 or finer paper, either wet or dry, or with water and pumice. Next the body is cleaned and given a quick spray coat consisting entirely of thinner, or about 90 per cent thinner and 10 per cent lacquer. This gives a satin finish. If a high gloss is desired the last operation may be omitted and replaced by polishing, using any of the standard polishes as customarily used with other finishes.



The ship which will be used by the Ethyl Gasoline Corporation for the extraction of bromine from sea water

Ship Fitted Out to Extract Bromine From Sea Water for Ethyl Gas

Important component of new fuel to be produced in floating plant at rate of 600 tons a year. Supply at present is limited, most of it coming from abroad. Vessel to get first trial next month.

THE marketing of ethyl gasoline as an anti-detonating motor fuel has led to the development of a new process for the manufacture of one of its constituents, ethylene di-bromide, the bromine component of which is to be extracted from sea water aboard a steamer at sea. The process referred to was worked out in the laboratories of the Ethyl Gasoline Corporation in Dayton, Ohio, and later developed by the E. I. Dupont de Nemours. Patents on it have been applied for.

When tetra ethyl lead alone is introduced into motor fuel to check the knocking tendency, upon its combustion metallic lead is deposited which, because of its fluxing characteristics, may prove very troublesome.

It was therefore decided, even before ethyl fluid was first marketed, to add to it an organic halogen compound, such as ethylene di-bromide. This reacts with the lead set free on combustion, forming lead bromide, which is only slightly volatile and enters into the incrustation of the combustion chamber wall, the so-called carbon deposit.

If a chlorine compound, such as trichlorethylene, is used instead of the bromine compound, then lead chloride will be formed, which will be similarly deposited. Lead sulphate, the grayish-white compound familiar in storage battery work, is also formed, the sulphur being supplied by the fuel, in which it may be contained in the form of an impurity.

Tests with ethyl gasoline to determine the amount of lead introduced into the combustion chamber have been made by the Bureau of Mines, and in a report on the investigations it is stated that the inorganic substances formed by the reaction between the lead and the halogen carrier on the one hand and the sulphurous acids of the fuel on the other, being solids at ordinary temperatures and having very low vapor pressures at such temperatures, quickly condense from the exhaust gases as particulate matter, most of which is deposited in the engine head and in the exhaust pipe. The remainder (about 25 per cent) is discharged with the exhaust gases, the largest particles together with chunks loosened from muffler and exhaust pipes falling to the floor or street, while the very small ones remain suspended in the air.

Percentage of Lead in Deposits

In one of the tests a gray deposit scraped from the cylinder head was found to contain 54 per cent of lead and a black deposit from the same place 21 per cent of lead. The deposit from the first 2 ft. length of the exhaust pipe contained 27.8 per cent of lead. The total amount of lead supplied to the engine in the form of tetra ethyl lead during the period over which this test extended was 83.7 grams. Of this amount 67.4 grams, or 80.6 per cent, was recovered in the deposits, including 20.7 gram in the gray deposit on the cylinder head, 2.8 gram in the black deposit on the cylinder head, 29.5 gram in the deposit on the first 2-ft. section of the exhaust pipe, 2.9 gram in the deposit on the rest of the exhaust pipe, 10.5 gram in the crankcase oil and deposits and 1 gram in drip pans under exhaust outlets.

A quantitative analysis of the engine and exhaust pipe deposits gave the following results: Lead chloride, 40.1

per cent; lead sulphate, 55.1 per cent; ferric oxide, 1.6 per cent; carbon, moisture and oil, 3.2 per cent.

Production of ethyl fluid on a large scale called for large quantities of bromine, an element which is now produced in limited quantities from brines in Michigan, Ohio and other States. The large increase in the demand resulted in a rapid rise in price, and while sodium bromide, the form in which bromine is usually sold, was quoted at 18 cents per pound in January, 1924, importers now ask 40 cents per pound and the domestic product is quoted at 48 cents per pound. In this connection it is interesting to note that abroad sodium bromide is obtained as a by-product in the manufacture of potash. Formerly Germany had a monopoly on this industry, but since some of the mines are located in Alsace, competition has set in between France and Germany, and as a result the latter country is now working only the purer deposits, which yield less of the by-product bromine. The foreign production of bromine is therefore declining.

It was this situation that decided the Ethyl Gasoline Co. to undertake experiments with a view to recovering bromine from sea water. The original experiments were carried out at the laboratory of the Ethyl Gasoline and General Motors Research Corporations at Dayton. Development work was then done by E. I. Dupont de Nemours Co. and upon its completion a semi-commercial plant was installed on the seashore at Ocean City, Md. The commercial process for the production of bromides which has been worked out was demonstrated there, but it has now been decided to work this process on board a steamer out at sea, instead of on land. There are four reasons which led the company to make this decision, as follows:

1. There are too many floating impurities, largely derived from sewage, in the sea water near the shore.
2. Owing to the pouring in of great quantities of fresh water from rivers, the water near the shore is more dilute and contains less bromine.
3. In the Gulf Stream, where the ship will operate, the average temperature is slightly higher which, it is believed, will aid with the process.
4. At the seashore the water holds in suspension a good deal of sand, due to the breakers and tides, which interferes with the filtering and pumping processes.

Sea water contains 0.0064 per cent of bromine and nearly 7 tons are required to furnish one pound of the element.

The Ethyl Gasoline Corporation bought from the Shipping Board one of its idle vessels, a so-called Lake type freighter, which had been lying idle at Hog Island for many months. Within its hull were installed the necessary apparatus for working the process, as well as a chemical laboratory for control and research.

It is expected that when in full operation the ship, which has been renamed the Ethyl, will be able to provide as much as 100,000 lb. of bromine per month or 600 tons a year. This compares with a total output in this country of 927 tons during the year 1918-19 and of a world output of possibly 2000 tons per year. An official trial of the floating plant will be made early in May.

New York City Simplifies Its Traffic Signals

(Photo by Underwood & Underwood)

NEW YORK traffic towers hereafter will be equipped with two signal lights instead of three. Until the change was made on April 28, red, green and yellow lights were used. Green meant stop, yellow to go ahead, and red was flashed as a preparatory signal, indicating either that running traffic should prepare to stop or that halted traffic should prepare to move, as the case might be. Under the new system the yellow light has been done away with. Traffic moves with the green light and halts with the red. It is believed that the simplified system will tend to eliminate a certain amount of confusion, inasmuch as the yellow light was difficult to see at long distances, affording little contrast to other street lights at night and losing its value in daytime.

Headlight Reflector Made in Halves

New lamp directs all rays downward. Auxiliary reflector used. Horizontal central wall and plain front glass among features.

A NOVEL principle is involved in the design of the reflector of the Hilco safety headlight, manufactured by the A. E. Hill Mfg. Co., Atlanta, Ga. The reflector is a surface of revolution. Its basic curve involves the conceptions of focus, directrix and axis, the same as the parabola of the standard type of headlight reflector, and any given point on the curve is equally distant from the focus and a particular directrix. But while the focus is fixed, the axis moves angularly around the focus as the describing point moves along the curve, and the directrix moves angularly with the axis.

An idea of the nature of the basic curve may be obtained from Fig. 1. The rotation of the curve axis angularly about the focus *L*, as a describing point moves along the curve, is said to be such that uniform illumination is secured along the roadway indicated by the line *CB*. Since the light from a particular part of the reflector will follow the direction of the axis for that particular point of the basic curve, it can readily be seen that any desired

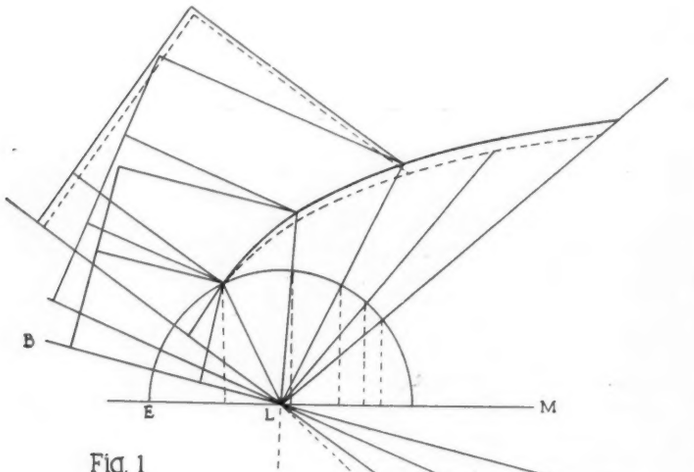


Fig. 1

distribution of light along the roadway may be secured by properly related rotation of the axis when drawing the basic curve.

The line *ELM* in Fig. 1 is known as the horizontal axis of the headlight. As is evident from the description given above, the horizontal axis is not the axis of the basic curve, which is variable, but it is the axis around which the basic curve is revolved to produce the reflecting surface.

The reflector, being a surface of revolution, can be manufactured as readily as a parabolic reflector.

A study of Fig. 1 will indicate that the curve above the horizontal axis and that below the axis are different, hence the reflector is composed of two dissimilar "halves." In practice the upper and lower "halves" are made independently, either by spinning the metal over separate forms, assembling the "halves" later, or, as in quantity production, by stamping dissimilar "halves" with dies.

Another feature of the headlight is a small auxiliary reflector placed ahead of the light source for the purpose of intercepting the flux which would otherwise be emitted

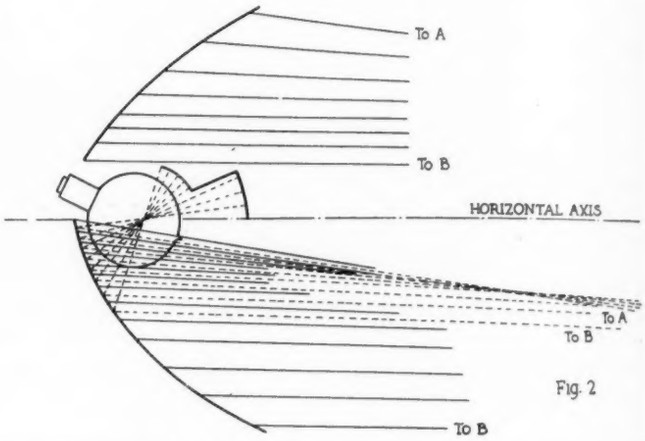


Fig. 2

as non-reflected light above the horizontal axis. The arrangement is illustrated in Fig. 2. It will be noted that the light flux from all reflecting surfaces is directed downward onto the roadway, and that no part of the beam is directed above the horizontal center line of the head lamp. The mechanical construction of the lamp is shown in Fig. 3.

A central horizontal plate or partition is employed which serves as a support for the reflectors and the bulb holder. This adds to the strength of the entire unit, and is claimed to permit of accurate and permanent focusing. Following are advantages claimed for this headlight by the manufacturers:

Light is distributed uniformly along the roadway ahead of the car.

Practically all of the reflected light is directed to the road, and for this reason a 21-cp. bulb gives a substantially greater road illumination than a much stronger bulb in a parabolic reflector, particularly where a non-glare lens is employed in conjunction with the latter.

No anti-glare lenses are required to meet the laws of the various States. Glare is eliminated by the design of the reflector.

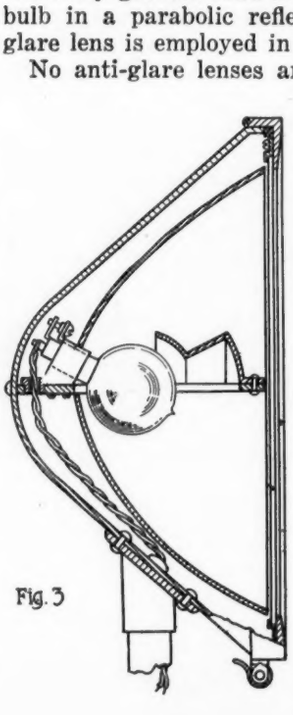


Fig. 3

The focus lies in the plane of the horizontal plate, and this, together with the simple adjusting mechanism for the light bulb, makes for easy focusing.

The reflectors are surfaces of revolution and their manufacture is declared to involve no difficulty.

The horizontal plate for supporting the reflectors and lamp bracket results in a rigid type of headlight that will stand the severe vibration to which automotive equipment is necessarily subjected and allows a system of non-concentric reflectors to be assembled in a practical and economical manner.

EDITORIAL

Time Payments

GENERAL statements about the time-payment situation are difficult to make right now. A number of stable finance corporations indicate that their repossessions bear about the same relation to total volume of business as last year and that conditions, so far as they are concerned, are highly satisfactory.

That there is a bit of uneasiness in some quarters, however, is not to be denied. Finance companies are out after business just as are automobile manufacturers and dealers. Keen competition in their field has lead to unsafe methods in some cases, just as the same cause sometimes has resulted in wild used-car trading in the retail automobile field. The big association of finance companies, formed in Chicago last year, has just reiterated its belief that time-payments should not be permitted to extend over a period of time of more than a year and that at least one-third of the total should be demanded as a down payment. This reiteration of principles was made necessary because some companies still persist in giving easier terms.

The dangers of over extension of time-payments never become really apparent so long as business is on the up-grade—but that is the time that retail financing conditions should be watched most carefully. When business slackens up these conditions come to the executive's attention without summoning.

Straight Thinking

HE has one of those lower jaws that come out to meet you and dare you to get sassy. He has been in charge of automotive production operations in three of the biggest and most successful automobile companies in the country. He doesn't have any flower in his button hole and you don't even have to look at his feet to know that he doesn't wear spats. He is a hard-boiled production manager.

"You can't get anywhere with a car unless the men who build it are sold on it," we heard him say the other day. "As soon as workmen lose confidence in the quality and performance of the car they are building, they somehow become worthless as workmen. I don't know what it is, but I've seen it happen too many times not to know what I'm talking about.

"In one plant I know about, the quality of the car dropped to such an extent that hardly a workman in the whole factory owned a car of the make he was building—and it was a low-priced car, too.

"The biggest production job in the world is getting together a good organization and then keeping the individuals sold on the product. The mental reaction of workers toward the car is an important factor in the ultimate success of any company."

One doesn't have to be a highbrow to understand the practical value of maintaining a constructive mental attitude in everybody in the plant.

Small Producers

THAT a number of car builders have passed out of the picture in recent years is certain. But it's just as certain that when the shake-down is completed there is going to be a fair number of small producers still doing business at the same old stand. It's human nature—particularly American human nature—to laud the big just because it is big and to lose sight of constructive development within smaller areas.

Huge consolidations never have succeeded in monopolizing any industry yet. In the oil and steel fields a goodly number of independents are operating and are making profits. If this is the case in these two older industries, whose products appeal relatively little to the individual imagination, how much better show has the small producer in the automobile industry with a product in the buying of which individual taste and desires always must play a large part?

A few companies already have taken a large percentage of total business in the automotive field, but the percentage left for the others amounts to no mean sum. And the spring sales reports of some of the smaller makers this year indicate that they are getting into a more healthy condition than has been possible for several years.

Crank Case Oil Drains

ONE of the most irksome operations in the maintenance of the older types of passenger car was the draining of the crankcase of oil.

Naturally, the owner dislikes crawling under the car every few weeks and removing a drain plug or—worse yet—a drain plate held in place by a number of cap screws, and some progressive makers therefore now provide a drain cock which can be opened by means of a handle located at the side of the engine.

Engines embodying this feature have been fitted for several years now, and, as there is apparently no proprietary right in the idea, it seems that it might well be adopted on all new passenger car and truck engines. Not only would it make the tending of the car a less onerous job but it would insure better attention to the crankcase oil supply and thus tend to protect the engine against unduly rapid depreciation.

Our Industry Today

Car Makers Not Gambling on Continued Activity for Many More Weeks—Indications Point to Record Year for Trucks and Buses

NEW YORK, April 29—Although production and sales of automobiles are being maintained at the high rate that was established early this month, and delays in meeting orders are common in the industry, car makers are not gambling on a continuation of the current activity for many weeks longer.

There are no signs of a slackening of demand on the horizon, but the general business situation is such as to inspire caution. The slowing up in several important industries that recently became evident may react upon automobile sales, despite the fact that agricultural conditions, as affecting the demand for cars and tractors, are regarded as generally excellent. Even the wheat farmers are buying more liberally than was expected earlier in the season.

The conservative policy of automobile manufacturers is shown in reports by parts and equipment makers. They receive orders for their products from 30 to 60 days ahead of the production of the finished car, and recently these orders have been falling off, indicating that the manufacturers are prepared to slacken production late in May or early in June, if the market situation calls for retrenchment.

Bus Outlook Favorable

In a sense, this represents no more than the normal seasonal trend, but production during December, 1924, and the first two months of this year was at such an unusually slow rate that the period of peak output might well be expected to continue longer into the late spring and early summer.

The figures for March production of trucks and buses, showing that that month was virtually on a par with the record month of the industry, bear out earlier predictions that more commercial vehicles will be sold this year than ever before. There is still time for a reversal of the tendency, however. Truck production bears a more intimate relation to the state of general commercial activity than any other branch of the industry. On the other hand, the outlook is for a steady advance in production and sales of buses.

Interest in Time Payments

Considerable interest is being taken in developments in the time sales division of automobile merchandising. The National Association of Finance Companies has found it desirable to reaffirm a principle established some time ago, to the effect that the sale of automobiles on the basis of an initial payment of less than one-third the cash involved is unsound. There is nothing to indicate, however, that the limit of caution has been overreached to any considerable degree.

Tire Price Raise Effective May 1

Increases by Leading Makers 5 to 15% — Balloons and Clinchers Are Excepted

AKRON, April 29—Leading automobile tire manufacturers in the Akron district have notified dealers that a general upward revision of tire prices will become effective May 1. Increases range from 5 to 15 per cent and include all grades except balloons and clincher tires. The Firestone Tire & Rubber Co. was the first to give definite notice of price changes.

Officials of the Goodyear, Goodrich, U. S. Rubber, Kelly Springfield, Miller and General companies said their revised schedules would follow closely that of Firestone. Some of the smaller companies planned to make even larger increases, it was stated. Firestone dealers were notified of 10 per cent increases on all tubes and solid tires and 4½ and 5-in. high pressure tires and 5 per cent boosts on the smaller straight side pneumatic tires.

Salesmen of the Kelly Springfield Co. said Kelly tires would be advanced from 12½ to 15 per cent, although definite schedules had not been arranged. While balloon and clincher tire prices remain at present levels, it is generally believed here that these will be advanced in the near future.

The majority of tire companies, especially the larger ones, have exhausted supplies of crude rubber, purchased at the cheap prices prevailing last summer. They had large stocks of rubber on hand, which cost from 17 to 20 cents. As long as this rubber lasted, there was no hurry to raise tire prices. Now, however, the companies are forced to buy rubber at more than double the former price, and tires are selling at the same level.

The large consumption of tires during this month, estimated at more than 20 per cent over the same period last year, will prevent any falling off in demand, which might otherwise ensue from higher prices, in the opinion of rubber trade experts. Upward of 2,300,000 tires were turned out by factories in the Akron district during April. This is nearly half a million more output than was reported in the same month last year.

Current production is running at the rate of about 117,000 tire a day. Practically all factories are operating at or close to capacity, on a 24 hour a day basis. The third, or night shift, which was curtailed at some plants last summer, is now in full operation.

Hudson Cuts Prices —Coach Now $1,250

NEW YORK, April 25.—A further cut of $95 in the price of the coach model effective tonight, has been announced by the Hudson Motor Co. This model now lists at $1,250. The five and seven passenger sedans have also been cut $100, now listing at $1,695 and $1,795 respectively.

In a little over a year, the price of the Hudson coach has been reduced four times; the total amount being $300, and the individual cuts varying from $50 to $105. During this period the price has dropped from $1,550 to $1,250, the new lowest level yet reached.

The prices of the Essex cars are not affected. The following tables show the old and the new prices of the Hudson models involved:

	Old Price	New Price
5 Pass. Coach	$1,345	$1,250
5 Pass. Sedan	1,795	1,695
7 Pass. Sedan	1,895	1,795

The reduction has been made without comment by the factory. As to the factors making the lower prices possible, production has been running at approximately 1,100 cars daily, or at plant capacity, and the factory is behind on orders. Practically the entire production is on the closed models, Essex, however, not being affected by price revision.

The present high rate of production is made possible through the factory preparing stocks of parts ahead.

ORDER ELECTRIC DRIVE BUSES

ATLANTA, April 28.—Fifteen gas-electric, double-deck buses have been ordered by the Atlanta Motor Coach Co. a subsidiary of the Georgia Railway and Power Company, for delivery July 1. The buses are of the Fageol type, with General Electric drive.

British Duties Reimposed

Winston Churchill in Annual Budget Speech Says McKenna 33 1/3 Per Cent Automotive Levies Will Be Restored July 1

LONDON, April 29 (*By Cable*)—Effective July 1, duties of 33⅓ per cent will be levied in Great Britain on all imports of passenger cars, motorcycles, parts and accessories. A preferential rate of 22 per cent is granted to shipments of these products from Canada. Tires, trucks and buses remain on the free list.

NEW YORK, April 29—Reimposition of the McKenna automotive duties of 33 1/3 per cent in Great Britain was announced yesterday in the annual budget speech of Chancellor of the Exchequer, Winston Churchill, at London. They will become effective on July 1, and will restore the tariff structure relating to automobiles which was abrogated by the Labor Government in Great Britain as of August last year.

Complete details of the proposals made by Churchill, all of which will undoubtedly be adopted by the powerful Conservative majority behind the present Government, are lacking. The belief among exporters here, however, is that the tariff will apply only to passenger cars, accessories and parts. The original McKenna duties were adopted as a war revenue measure but did not include trucks, tires and certain service equipment and the opinion expressed is that the Churchill proposals do not embrace these lines.

The budget speech chiefly concerned itself with the return of the British currency to a gold standard, as of July 1, with an emergency credit of $300,000,000 set up by the Federal Reserve Bank and the Morgan interests in this country, to protect the pound sterling when it gets back to its gold parity. South Africa, it has been announced, will likewise return to a gold standard on the same date and Chancellor Churchill declared that he was authorized to state that Australia and New Zealand, among the British Dominions, would also set up a gold basis. Holland and the Dutch East Indies are soon to back their currencies with gold exchange guarantees, the result being that a great part of the world, both in Europe and in other sections, will no longer be hampered by the fluctuations in currency values that have marked the post-war business.

Will Stimulate Business

The interest of exporters was divided between the McKenna provisions and the currency provisions, each of which will have a profound effect upon the course of the automotive export business. On the one hand, the British market will be made more difficult for American car producers but, on the other, international commerce is freed of the dead weight of currency fluctuations in many of the best export markets. Business, in the long run, will unquestionably be stimulated.

Even with the McKenna duties, the sale of American cars will not cease in Great Britain, insist various export managers who, however, have no false illusions as to the potential volume of business. Several companies maintain branch assembly plants importing parts only and these lines will not be affected to such a degree as are those shipping direct. Preferential tariff to Canada is also embraced within the proposal, presumably returning to the old 22 per cent duty. Reports have already been received that Canadian plants anticipate an upswing in shipments to Great Britain.

The Churchill proposal came as a distinct surprise to many of the export executives, although there had been within the last few weeks a number of indications that some change would be made. That it was not specifically directed at America is believed likely, as French and Italian makers of light cars, similar to the type most commonly used in Great Britain, have been the chief gainers from the Labor Government's action. British and American lines have not competed so strongly in the British market as have various Continental makes.

British Prices Cut

Price reductions have been marked on the British market within the past few months, indicating that British makers have been forced to shave profits to keep up production. However, all reports have been that both production and sales had reached new levels. Opinion was divided as to whether prices would increase in Great Britain, after the present situation clears, and whether heavy shipments would be the rule between now and July 1.

Ford, it is believed, will be affected only indirectly. His plant at Manchester, according to announcement, is now building a vehicle of 90 per cent British made parts, the cylinder blocks coming from the Irish plant at Cork. Trucks make up a large percentage of the Ford sales.

EQUIPMENT MAKERS MERGE

CLEVELAND, April 28—The Outlook Co. of this city has been merged with the Sterling Manufacturing Co. and its manufacturing and distribution will be conducted under the name of the second concern.

G. M.—MACK TRUCK DEAL DENIED BY SLOAN

NEW YORK, April 29—The widespread rumor that General Motors Corp. is negotiating for Mack Trucks, Inc., was emphatically denied by Alfred P. Sloan, Jr., president of General Motors, in a statement to AUTOMOTIVE INDUSTRIES today.

"There is no foundation whatever to the report," said Mr. Sloan. "We are solely concerned in developing the present business of General Motors, and are not interested in acquiring any outside interests."

The rumor factory had it that General Motors wished to acquire Mack Trucks so as to round out its organization with a large producer of heavy trucks.

Many Car Makers Set Output Records

DETROIT, April 29—Preliminary figures on the industry's production and shipments for April indicate that the 400,000 mark will be reached and perhaps exceeded to the extent that a new all time high record will be set. A majority of the car companies will go beyond any previous month's manufacturing record, the others maintaining high figures.

Ford Motor Co., with production and shipments of approximately 175,000, will head the list, this total being increased by the output of Ford of Canada and its foreign manufacturing companies. Chevrolet Motor Co. will approximate 52,000 for the month; Dodge Brothers, Inc. will approximate 25,000, and Hudson Motor Car Co. will exceed the 20,000 figure.

Will Pass 400,000 Mark

Approximate figures on shipments by other companies in this district will show Buick with 17,000, Studebaker and Maxwell-Chrysler with 14,000, Star, 10,000; Paige-Jewett, 5500; Oldsmobile, 6000; Oakland, 3500; Hupmobile, 3500; Packard, 2500; Reo, 3500; Cadillac, 2000; Rickenbacker, 1500.

With the production figures from manufacturers in other districts, it is regarded as certain that the 400,000 mark will be passed, this, of course, including the truck figures, which in the case of companies producing both cars and trucks is included in the general total. Truck shipments, though not showing the seasonal influence increasing the car total, are at high marks.

"Facts and Figures" Issued by N. A. C. C.

Annual Statistical Report on Automobile Industry More Complete Than Ever

NEW YORK, April 29.—The 1925 edition of "Facts and Figures," the annual statistical review of the automobile industry issued by the National Automobile Chamber of Commerce, is now being distributed. Although no larger than former editions, it is more complete, and a great deal of pertinent information is given with considerable economy of space.

For the man in close daily contact with some phase of the automobile business, "Facts and Figures" affords the opportunity of a broad view of the whole picture of an industry that stands first among American manufactures, that exports only 12 per cent of its products yet stands fourth among all United States exports.

Cars Cost Less

Among the most interesting of the studies in "Facts and Figures" is one that has to do with comparative costs. It is shown that on the basis of the pre-war dollar, an automobile costs only 71 cents today, while general living costs 167 cents. In percentages, cars cost today 29 per cent less than before the war and commodities in general cost 67 per cent more. If the farmer in 1913 sold 1482 bushels of wheat to buy an automobile, today he has to sell only 506 bushels. If he sold 17,074 pounds of hogs, he now sells 8,806 pounds to buy his car.

Considerable space is devoted to the principal fields in which development of truck and car sales in the next few years are expected. The railroads, it is shown, are increasing their use of motor vehicles. Thirty-three of the roads in the United States and Canada are now using motor trucks as part of their shipping service and 21 contemplate, or are investigating, the use of trucks for the first time, or expect to add to their present trucking service. One hundred and seventy-four are using approximately 483 gasoline rail motor coaches.

60,000 Buses in Operation

Sixty thousand motor buses are now in operation in the United States, it is estimated.

Of the total registration of motor vehicles in the United States—17,591,981—it is shown that 4,265,280 are in communities under 1,000 population and that the total of motor vehicles owned on farms is about 3,821,085.

The total capital invested in automobile manufacturing grew to $1,691,050,112 in 1924 from $1,571,722,400 in 1923, truck manufacturing growth being at a relatively higher figure than car manufacturing. The average price of new cars sold is $825.

The average outstanding note on motor vehicles is $252; averages of 50 leading finance companies give losses of only .18 of 1 per cent.

Wages and salaries paid to employees of the motor vehicle manufacturing business in 1924 totaled $547,215,700.

The wholesale value of motor vehicles and parts, totaling $3,168,588,146 last year, was divided into cars, $2,011,038,288; trucks, $317,027,716, parts sold by motor vehicle manufacturers, $240,308,142, and replacement parts and tires, $600,214,000.

DEALERS OPPOSE TIRE LISTS FOR CONSUMERS

NEW YORK, April 29—Opposition among tire dealers to a resumption of publication of consumers' price lists by tire manufacturers was indicated in a poll of members recently completed by the National Tire Dealers Association. A tabulation of the returns showed that 53 per cent were opposed to a resumption and 47 per cent favored it.

The poll was national in character, answers to the questionnaire having been received from 35 States, according to George J. Burger, president of the association. The indication is, he says, that the majority of dealers have found it more satisfactory to set their own prices than to have to follow those set by the manufacturers.

Oehler Chosen Head of Welding Society

NEW YORK, April 25—The annual meeting of the American Welding Society, and in connection therewith a meeting of the American Bureau of Welding, was held in the Engineering Societies Building April 22-24. A. G. Oehler of *Railway Age*, New York, was elected president of the society for the coming year; George Bird of the Bird-Potts Co., Atlanta, Ga., vice-president for the Southern Division; Charles S. Smith of the Linde Air Products Co., San Francisco, Cal., vice-president for the Pacific Coast Division; James M. Burke, Burke Electric Co., Erie, Pa.; Joseph Meadowcroft, E. G. Budd Mfg. Co., Philadelphia, Pa.; S. W. Miller, Union Carbide & Carbon Co., New York, and H. A. Woofter, Thomson Electric Welding Co., Lynn, Mass., directors at large; C. A. McCune, American Chain Co., Bridgeport, Conn., treasurer, and M. M. Kelly, secretary.

The American Bureau of Welding, a research organization, also held its election. C. A. Adams, professor of electrical engineering at Harvard University, was reelected director of the bureau.

The next meeting will be held at Boston Oct. 27-30.

Substitutes Sought for Motor Fuel

Conservation Board Inquiries Sent to Representative Men of Industry

WASHINGTON, April 30.—A searching inquiry into possible substitutes for gasoline is sought in a letter containing sixteen questions which is this week being sent by the Federal Oil Conservation Board, of which Secretaries Work, Weeks, Wilbur and Hoover are members, to several score representative men in the automotive industry.

"We are now using an average of about 20,000,000 gallons of gasoline daily," the Board confides in its letter, stating this figure has been certified to them by Government experts. "This country," the Board further states on advice of its technical experts, "is the largest producer and the largest consumer of petroleum, with rapidly diminishing resources."

Following are some of the questions asked in the letter:

Could alcohol for motor fuel purposes profitably be made from grains grown for the purpose, in quantities sufficient to affect the demand for gasoline?

Could alcohol for motor fuel purposes profitably be made from potatoes or other vegetables cultivated for the purpose, in quantities sufficient to affect the demand for gasoline?

To what extent, quantitatively, can benzol for motor fuel be produced at existing coke oven and carbonization plants?

What is possible total maximum production of benzol for motor fuel, assuming entire coke consumption of the United States thus involved?

What is relative efficiency in motor propulsion of gasoline and (a) alcohol, (b) benzol, (c) mixtures of gasoline and alcohol, (d) mixtures of gasoline and benzol?

Martin-Parry Leases Former Dort Plant

FLINT, April 27—Martin-Parry Corp. has leased one of the downtown plants of the former Dort company, as the site of its Flint manufacturing operations. The plant that it occupied until recently here was destroyed by fire last week. Stocks of commercial bodies destroyed in the fire are being replaced immediately by shipments from the main Martin-Parry factories.

The factory occupied by the Martin-Parry Corporation destroyed in the fire was the original manufacturing building of the Durant-Dort Carriage Co., predecessor of the Dort Motor Car Co. It was in this company that many of the automobile industry's present executives obtained their early manufacturing training. The carriage company was one of the most successful of its kind in the pre-automobile days, laying the foundation of the later successes of William C. Durant and J. Dallas Dort.

To End Uncertainty in Interstate Lines

A. A. A. and N. A. C. C. Seek Opinions on Truck and Bus Operation Between States

WASHINGTON, April 30—Spurred on by the uncertainty now existing in the bus and truck field, due to the two decisions recently handed down by the Supreme Court of the United States, affecting the regulation of buses and trucks engaged in interstate business as common carriers, the bus and truck divisions of the A. A. A. are this week sending out a referendum to 105 truck and bus associations, asking them to specify their position with regard to regulation. Similar inquiries of manufacturers are being made by the National Automobile Chamber of Commerce.

Three alternatives were set forth in the referendum of the A. A. A.: First, whether bus and truck operators desire the present status to continue; second, whether it is their desire that the Interstate Commerce Commission should be empowered by Congress to regulate them as common carriers, and third, whether Congress should enact legislation granting regulatory powers to State utility commissions.

Decisions Not Alarming

Outside of the uncertainty they created as to the future, says President Thomas P. Henry, there is nothing alarming about the Supreme Court decisions themselves. "The two decisions," he continues, "namely, Buck versus Kuykendall and Bush versus Maloy, passed on the right of a State to refuse to issue a certificate or permit to bus and truck organizations operating exclusively as common carriers in interstate business. At this time it is impossible to predict what the ultimate effect of the decisions will be, but it is important that the uncertainty should be removed so that the industry can go forward untrammeled."

WASHINGTON, April 30—Federal jurisdiction over highways is an issue in a suit now being prosecuted by the Government in the United States District Court for Indiana. Attorney General Sargent announces the Government has obtained a temporary injunction against demolition of a section of the Lincoln Highway in Indiana and will sue this week on a petition for a permanent injunction.

The Government will contend that the excavation if completed will block interstate traffic and damage property belonging to the Federal Government, as the highway was constructed partly with Federal aid funds.

If the Government is successful in obtaining a permanent injunction, a precedent will be established in Federal jurisdiction of interstate highways, according to Ira K. Wells, the Assistant Attorney General who has supervision of the case. This is the first case of this character that has arisen, said Mr. Wells this week and may signalize the initiation of Federal jurisdiction over interstate highways.

FORD FOREIGN SALES BREAK ALL RECORDS

DETROIT, April 27—Ford Motor Co. reports all foreign sales records broken in the first quarter of the year, March showing the largest gain of any month for the period with a gain of 35 per cent over the same month last year. This record breaking sale extended to all Ford products, with better business conditions general throughout all Europe and South America. Largest increases in individual countries were in France and Brazil.

Foreign sales figures for the quarter, exclusive of those by Ford Motor Co. of Canada, Ltd., show deliveries of 49,567 Ford cars and trucks as compared with 40,949 last year. Fordson tractor sales increased more than 60 per cent, totalling 3844 for the three months as compared with 2447 deliveries a year ago.

Lincoln car sales for the first quarter in the foreign markets increased 35 over the same period last year, setting a new record.

Industry's Payroll Increases in March

WASHINGTON, April 30.—The automotive industry was one out of 41 industries which showed increased payroll totals in March over the preceding month, it is announced here by the Bureau of Labor Statistics, with a March payroll of $15,326,233 as compared with $14,548,222 in February. The automotive industry also, the Bureau announces, was one of nine industries to show gains in employees' earnings. In March, 1925, the industry had 468,762 on its payrolls which was 4.4 per cent more than they had in February, 1925, when they had 488,813 on the payroll.

In comparing one week in March, 1924, with one week in March, 1925, the automotive industry shows a loss of 12.9 per cent in the number of workers on the payroll and a loss of 11 per cent in the amount of the payroll.

On the other hand, the automobile tire industry was one of twelve industries to show a substantial gain in employment in March, 1925 as compared with the same month in 1924 with 15.4 per cent in employment and 16.2 per cent in payroll totals.

Reo Exceeds March Record This Month

Company Officials Expect Good Business to Continue Until Fall

LANSING, April 27.—Reo Motor Car Co. shipments to April 22 had exceeded the total of all March shipments by 400 vehicles, according to company shipping records. The March total was the largest the company had enjoyed in its 21 years of operation, but despite this the continuance of record business into April made it possible to exceed the March total with seven operating days to spare.

In the expectation of Reo officials, good business will continue through to October. Reports received at the factory from dealers lead to this conclusion and the company is basing its manufacturing operations on these reports exclusively. There is a general buying spirit throughout the country, the company reports, agricultural and industrial districts being equally represented.

Operations throughout the country seem to be in balance, it is stated. Every section is meeting with good crops and good prices and the industrial districts likewise are operating on good business volume. The surest indication of the general buying tendency, the company reports, is the constant flow of telegrams from its retailers asking immediate deliveries and increases in allotments.

Stocks among dealers are at low marks and the company itself has no vehicles stored anywhere. To meet sales requirements the company is operating at capacity with many departments working overtime.

Ford Gives Edison First U. S. Johansson Gages

DETROIT, April 29—Henry Ford has sent to his friend, Thomas A. Edison, the first complete set of Johansson gages manufactured in the United States. The set consists of 81 blocks, and these delicate little pieces of steel are accurate within four-millionths of an inch. They are contained in a newly developed Bakelite case.

For many years Johansson gages have been accepted as standard for measurements throughout the world, and until recently they were manufactured exclusively in Sweden, the native land of the inventor, Carl E. Johansson. In order to take care of the United States needs, the Johansson company acquired a plant at Poughkeepsie, N. Y., but before manufacture of blocks began the Ford Motor Co. in 1923 purchased the plant together with the American manufacturing rights. Mr. Johansson joined the Ford organization as a member of the engineering staff to further develop his precision instruments.

Briggs Mfg. Co. 1924 Net Income $11,135,576

Gross Profits $14,554,209 with Capital and Surplus of $25,739,344

DETROIT, April 27—The balance sheet of Briggs Manufacturing Co. as of Dec. 31, 1924, shows total current assets of $19,537,650.30, and current liabilities of $2,549,522.89. Current assets include cash of $10,477,713.02, receivables of $4,223,188.13 and inventories of $4,836,749.15. Current liabilities include current accounts payable not due of $2,549,522.89 and accrued expenses not due of $31,482.69.

Income account statement for the year shows gross profits from sales of automobile bodies and parts of $14,554,209.81, and other income of $587,043.17. Selling, administration and general expenses were $866,849.25, and provision for depreciation, $1,548,327.14. This, with provision for Federal income taxes of $1,590,500, left net income transferred to surplus account of $11,135,576.59. With this addition less deductions of dividends paid of $2,030,236.29, the capital and surplus as of Dec. 31, 1924, is brought to $25,739,344.15.

Other assets of the company are shown as miscellaneous accounts and advances of $82,460.88 and leasehold of $15,104.10.

Jardine to Be Speaker at Transport Meeting

WASHINGTON, April 29—Outlining the place of the highways as avenues of commerce, William M. Jardine, Secretary of Agriculture, will address the Midwest Motor Transport conference to be held in Chicago May 27-28. His topic is "The Public and Highway Transport."

Secretary Jardine and the U. S. Bureau of Public Roads in his department have been paying particular attention to the commercial relationship of highways to farm prosperity and general use by the public. May 26-27 were the dates formerly set for the conference.

Prest-O-Lite Dealing Direct with Retailers

INDIANAPOLIS, April 28—The Prest-O-Lite Co., Inc., through its vice-president, R. J. Hoffman, has announced that its distribution system will now be carried on through the retailer direct from the factory. This policy was inaugurated last August, but public announcement was withheld until the plan could be put into complete operation. Several distributors have been retained in certain sections.

A reduction of 25 per cent in the price of Prest-O-Lite starting and lighting batteries and radio batteries is also announced.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, April 29—Last week's principal financial development was the renewed advance in the pound sterling to within less than 4 cents of its par value, with a prospect of early resumption of the gold standard in London. Moderate recessions in activity were noted in certain important branches of industry and trade. General commodity prices again turned downward.

Crop reports are generally favorable, although there is a severe drought in the Southwest, resulting in general trade depression.

The rate of activity in iron and steel manufacture still tends downward. Price weakness is general in nearly all the metal trades.

Building permits reported by Bradstreet's for the first quarter were 8.9 per cent below the corresponding total a year ago. The decline reflects mainly a sharp curtailment in New York City.

Car loadings in the week ended April 11 numbered 917,284, comparing with 922,375 in the preceding week and 880,847 in the corresponding period last year. Loadings since the first of the year are 2 per cent larger than a year ago, and 3.3 per cent above the figure for 1923.

Production of crude petroleum in the week ended April 18 showed a sharp advance, averaging 2,080,650 barrels a day, as against 1,993,600 barrels in the preceding week and 1,932,350 in the corresponding period last year. The gain was due chiefly to the increased output from the Smackover district of Arkansas.

Business failures in the week ended April 23, according to Bradstreet's, numbered 389, as compared with 365 in the preceding week and 390 a year ago.

Bank debits to individual accounts in the week ended April 22 were 10.7 per cent larger than the total for the preceding week and 26 per cent above the corresponding figure a year earlier.

Fisher's index of wholesale commodity prices stood at 155.7 last week, comparing with 157.8 a week earlier and 158.1 two weeks earlier. Last week's average is the lowest since the third week of December.

Discounts of Federal Reserve banks increased $17,100,000 during the week ended April 22, the bulk of the gain being in bills secured by Government obligations. Open market purchases increased $1,400,000, while holdings of Government securities declined $4,800,000. The circulation of Federal Reserve notes decreased $10,400,000, while total deposits gained $9,800,000. The reserve ratio rose from 76.4 to 76.5 per cent.

Studebaker Reports Gain First Quarter

$3,605,780 Three Months Net Profit—Operating at Capacity

NEW YORK, April 29—Report of the Studebaker Corp. and subsidiary companies for the first quarter of 1925 shows a small gain in earnings, the total net profits, after deductions including taxes, being $3,605,780, against $3,542,259 for the first three months of 1924. The total for the early quarter of this year is equal to $1.84 per share on the common stock. Net sales to March 31 were $35,205,221 this year and $35,603,490 last year.

Says President A. R. Erskine:

Plant operations, which were under curtailment in January and February, were increased to capacity in March. Cars in dealers' stocks and in transit to them, including demonstrators, on April 1 were 46 per cent less than the same date in 1924 and 25 per cent less than in 1923.

All plants are now operating at capacity, and production for the second quarter will exceed 40,000 cars. Demand greatly exceeds output, and cars are therefore being distributed among dealers on a pro rata basis. April collections will be about $18,000,000. Generally speaking, conditions with us were never better.

The consolidated balance sheet of the parent and subsidiary companies as of March 31 shows a substantial gain in cash, which amounted to $8,934,680 as compared with $5,138,048 on Dec. 31, 1924. Inventories during the three months' period decreased from $29,861,633 to $26,158,848. Total quick assets increased from $49,399,055 to $51,311,724. Current liabilities declined from $15,672,731 to $15,363,807.

New Lincoln Sport Touring at $4,500

DETROIT, April 28.—A sport touring model has been added to the Lincoln line by Ford Motor Co., the list price on which is $4,500. Among more important items of standard equipment are six wire wheels with balloon tires, front bumper, and rear fender guards, windshield wings, folding trunk rack, nickeled windshield frame and durable top of special material fitted over mahogany wood bows. The top folds back very flat and is covered with a snug fitting top boot of same material. Upholstering is in the plain panel effect of dual tone leather.

NO PATENT INFRINGEMENT

LOS ANGELES, April 29—In a suit involving patents on motor oiling devices, Judge William P. James, in the United States District Court here, held that Roland & Koch, manufacturing under the Robinson patent numbered 1,268,281, had not infringed the Francisco patent numbered 1,208,126, held by W. O. Thompson.

St. Louis to Be Link in Ford Air Route

ST. LOUIS, April 29—Col. Albert T. Perkins, general manager of the United Railways Co., recently returned from a trip to Detroit, where he discussed with Henry Ford plans for linking St. Louis by airplane with St. Paul, Detroit and Chicago. Perkins presented the plans to a committee of the St. Louis Chamber of Commerce.

It is proposed to organize an operating corporation with a capitalization of $200,000, of which $50,000 is to be subscribed in each of the four cities. St. Paul, Perkins said, has already raised the necessary $50,000, and the Chicago Chamber of Commerce has undertaken to raise that city's share.

The proposed service is to make use of the Stout metal airplane, made by a company of which Henry Ford and his son, Edsel, are directors.

The corporation would bid for the mail contract between the three other cities and Chicago. A plane leaving St. Louis at 5:30 p. m. and reaching Chicago at 8:30 would connect with the plane which is to leave Chicago at 9:30 p. m. for New York, arriving in New York at 6 o'clock the next morning. The night flyer between Chicago and New York is to be over a lighted course.

Ford Motor Co. has pledged itself to make up for any deficit in express or passenger loads by shipping parts to its branches by the air service. Plans for training pilots are also being considered.

Among those attending the meeting of the St. Louis Chamber of Commerce were W. Palmer Clarkson, president; Maj. Albert Bond Lambert, Carl F. G. Meyer and Albert Von Hoffman.

Col. Perkins said he had assured those with whom he conferred in Detroit that the Lambert-St. Louis Field at Bridgeton, St. Louis County, would be available for a landing place for the planes of the proposed service.

Perkins also announced that he had received a request from the National Aeronautical Association that St. Louis hold the Pulitzer trophy race here next fall. The race was held here in 1923 as the final feature of a three-day air meet.

A sub-committee of the Chamber of Commerce will consider both the Ford proposal and the air race proposition.

CADILLAC SALES INCREASE

DETROIT, April 28 — Sales and deliveries of Cadillac cars have shown an upward trend throughout the year, according to Lynn McNaughton, vice-president and general sales manager of the Cadillac Motor Car Co. Deliveries for the first week in April were larger than for any corresponding period since the first week of May 1923. There is a constant strengthening of the market, factory reports state, with orders booked well in advance of production.

Exports, Imports and Reimports of the Automotive Industry for March of Current Year and Total for Nine Months Ending March 31, 1925

	Month of March				Nine Months Ending March 31, 1925			
	1924		1925		1924		1925	
	Number	Value	Number	Value	Number	Value	Number	Value
EXPORTS								
Electric trucks and passenger cars	32	$ 45,376	7	$ 15,124	156	$ 210,368	98	$ 143,152
Motor trucks and buses except electric:								
Up to 1 ton	1,836	794,750	.....	.....	15,644	6,475,898	9,403	3,847,905
Over 1 and up to 2½ tons	404	548,494	998	1,197,812	3,403	4,415,776	4,555	6,005,013
Over 2½ tons	88	264,615	126	435,479	1,110	2,855,708	1,106	2,969,306
Total motor trucks and buses except electric	2,328	1,607,863	4,728	3,169,533	20,157	13,747,382	22,646	15,980,676
PASSENGER CARS								
Passenger cars, except electric:								
Value up to $500 inclusive	5,614	1,979,799	9,475	3,417,958	39,880	14,398,548	48,450	17,758,028
Value up to $800	4,339	2,855,607	5,711	4,047,774	26,891	17,754,732	31,975	22,621,025
Value over $800 and up to $2,000	3,847	4,070,900	.....	.....	33,140	35,407,418	22,761	26,749,809
Value over $2,000	235	666,369	605	1,621,779	2,163	6,077,929	2,943	8,193,424
Total passenger cars, except electric	14,035	9,572,675	23,265	17,675,385	102,074	73,638,627	123,588	95,639,108
PARTS, ETC.								
Parts, except engines and tires:								
Automobile unit assemblies (Lbs.)	34,478,428	6,166,974	28,001,754	4,810,250	216,000,626	43,601,379	142,595,902	25,123,116
Accessories and parts (Lbs.)	8,480,389	2,343,266	13,115,682	3,640,234	29,776,479	7,464,050	74,988,231	21,594,928
Automobile service appliances (n.e.s.) (Lbs.)	416,481	146,483	862,139	346,976	2,528,034	1,147,755	6,004,448	2,575,000
Station and warehouse motor trucks (No.)	10	8,997	48	48,097	159	100,751	145	98,379
Trailers (No.)	29	21,704	77	26,294	371	128,913	504	179,295
Airplanes (No.)	7	19,670	21	127,120	58	314,991	41	277,781
Parts of airplanes, except engines and tires (Lbs.)	48,546	52,131	5,080	20,405	257,979	102,092	74,366	101,165
BICYCLES, ETC.								
Bicycles and tricycles	579	14,966	657	17,455	16,331	173,683	5,640	142,382
Motorcycles	1,531	382,191	2,494	533,503	15,374	3,747,895	13,656	3,085,834
Parts, except tires (Lbs.)	363,882	189,628	237,948	118,435	2,591,994	1,357,006	1,944,545	1,093,828
INTERNAL COMBUSTION ENGINES								
Stationary and Portable:								
Diesel and Semi-Diesel	83	10,651	16	17,373	682	194,604	721	307,420
Other Stationary and Portable:								
Not over 10 H.P.	1,884	167,371	2,423	203,546	18,999	1,716,220	21,121	2,027,491
Over 10 H.P.	102	65,682	169	222,345	2,166	1,213,290	1,524	1,335,879
Automobile Engines for:								
Motor trucks and buses	100	14,461	3,372	308,382	1,064	111,766	19,032	1,656,353
Passenger cars	3,476	514,529	12,261	1,677,407	21,600	3,219,362	35,183	4,495,081
Tractors	26	9,518	39	27,471	1,544	396,477	2,089	665,046
Aircraft	33	42,150	5	20,000	137	156,481	45	81,030
Accessories (Lbs.)	1,091,598	443,239	1,014,857	440,772	6,327,772	2,727,624	5,463,023	2,478,947
IMPORTS								
Automobiles and chassis (dutiable)	39	69,093	29	52,414	649	609,343	389	636,731
Other vehicles and parts for them (dutiable)	.....	113,910	.....	83,823	.....	1,169,458	.....	525,582
REIMPORTS								
Automobiles (free from duty)	13	31,725	8	13,616	313	496,443	438	650,044

Proceed with Merger of Holt and Best

Calif. Caterpillar Tractor Co. will Be Combination of Coast Firms

SAN FRANCISCO, April 28.—Stockholders of the C. L. Best Tractor Co. and the holders of the first preferred stock of the Holt Manufacturing Co., will meet in May, at a date not yet officially announced, to consider matters in connection with the merger of the two firms into the California Caterpillar Tractor Co., largest corporation manufacturing tractors exclusively.

Following the announcement of the combination of the two concerns, both Best and Holt stock put on an exhibition of skyrocketing on the San Francisco Stock Exchange, with Best holding firm at 115; Holt at 123½, and the Caterpillar company leaping from 73 to 80. Peirce, Fair & Co., which controls the common stock of both Best and Holt, issued a statement defining the new caterpillar corporation, and covering points not previously mentioned in this correspondence. This statement says, in part:

The Caterpillar Tractor Co. of California is a corporation being formed under the laws of California to acquire all the assets, patents and trademarks of the C. L. Best Tractor Co., a California corporation, hitherto the sole manufacturer of Best Tracklayer tractors, and of the Holt Manufacturing Co., another California corporation, heretofore the sole manufacturer of Holt caterpillar tractors. The new corporation will own the following plants:

(a) San Leandro, Cal., a plant occupying 10 acres, of which 5½ acres are under roof, fully equipped for the complete, economical manufacture of 2500 tracklayer tractors per year.

(b) Stockton, Cal., a plant occupying 21 acres, of which 12 acres are under roof, equipped for the manufacture of combined harvesting machines, and for the manufacture of spare parts for caterpillar tractors.

(c) Peoria, Ill., a plant occupying 40 acres of land, of which 14 acres are under roof, fully equipped for the manufacture of 5000 caterpillar tractors per year.

All of these properties are owned in fee and are unencumbered except that certain buildings—the values of which are not included in plant figures on the appended balance sheet—in the manufacturing plant group at Peoria, which were erected during the war by the United States Government, are held under favorable purchase agreement.

The same announcement contains the statement that the board of directors and the official staff of the new Caterpillar Tractor Co., of California will consist of C. L. Best, chairman of the board; R. C. Force, president; B. C. Heacock, vice president and secretary; M. M. Baker, vice president; P. E. Holt, vice president; O. L. Starr, general factory manager; Allen L. Chickering, Harry H. Fair and John A. McGregor, directors.

The capital structure of the new corporation consists of a single class of stock, of a par value of $25 per share, of which there will be issued soon 260,000 shares, out of an authorized total of 500,000 shares. Book value of the stock to be issued, on the basis of the combined balance sheet, will be approximately $50 per share. The depreciated reproduction value of the plants involved in the merger, however, exceeds their book value by approximately $1,500,000, or more than $5 per share. Dividends are to be established at the rate of $5 per year, per share, payable $1.25 per share per quarter.

(*Continued on page* 803)

Meeting Called for Freight Rate Parley

NEW YORK, April 29—The monthly meeting of traffic managers, members of the National Automobile Chamber of Commerce, has been called by J. S. Marvin, chairman of the conference, at General Motors Building, Detroit, May 1.

Further proceedings by the chamber in connection with the general investigation of all freight rates will be discussed. A special committee will attend the meeting of the National Industrial Traffic League at Indianapolis, April 29-30, which has been called to formulate a statement by the league on this matter. The Interstate Commerce Commission, acting under the Hoch-Smith joint Congressional resolution, has invited statements by shippers' organizations and railroads on the intent of that resodution prior to May 15.

Jordan Makes Contract for Sales in Germany

CLEVELAND, April 29—The Jordan Motor Co. of this city has signed contracts with Walter Spitz, representing the Deutsche Automobile Bank A.G., of Berlin, Hamburg, Frankfort and Munich for the sale of all Jordan cars that the German government will allow him to take into that country.

The quota at present allowed each automobile company is but four cars a month, but Edward S. Jordan, president of the company, is of the opinion that the limitation will be lifted, and that the government will be more liberal. Mr. Jordan looks for important developments in the commercial life of Germany. That country, according to reports, has already felt the ill-effects on traffic and transportation that the restrictions on the importation of American-made automobiles have produced.

NEW KAHLENBERG PLANT

TWO RIVERS, WIS., April 27—Contracts have been awarded by the Kahlenberg Brothers Co., manufacturer of gas engines, for a brick and steel manufacturing addition, 85 x 105 ft., one story. The additional area is needed to handle an increasing run of orders for marine engines and other power units, and will become available about June 15.

Motor Truck Makers Discuss Distribution

Standardization Considered at Meeting—Stephenson Elected Association Head

NEW YORK, April 29.—Various aspects of truck production and merchandising were the theme of discussions at a meeting of members and guests of Motor Truck Industries, Inc., held at the plant of the Service Motors, Inc., Wabash, Ind., April 23. J. W. Stephenson, of the Indiana Truck Corp., was elected president, and Paul Moore of the Service Motors, Inc., first vice president, these two offices having been vacant since the first of the year.

Papers on sales distribution, dealing with lists and discounts, were given by Mr. Moore and by J. R. Spraker of the Atterbury Motor Car Co.; Ollie Hayes, president of the Republic Truck Co., spoke on "The Effect of Parts Depots on Truck Sales," and C. J. Helms, secretary and general manager of the Acme Motor Truck Co., Cadillac, Mich., discussed "Proper Ratings on Motor Trucks." Mr. Hayes was asked to prepare a paper on "Distribution Through Branches" for the next meeting, to be held June 4 at the Spicer Manufacturing Corp., plant at South Plainfield, N. J.

Standardization Board Named

Truck parts standardization, the primary object of the association, was briefly discussed by B. A. Gramm of the Gramm & Kincaid Motors, Inc., and R. E. Carpenter of the Spicer Manufacturing Corp. The economies possible if truck and parts manufacturers could agree to put into effect a standardization program were stressed, and the directors were asked to appoint a committee to deal with this subject and make their first report at their next meeting.

New members elected were: Wisconsin Parts Co., Oshkosh, Wis.; Corbitt Motor Truck Co., Henderson, N. C.; Fuller & Sons Manufacturing Co., Kalamazoo, Mich.; Electric Auto-Lite Co., Toledo, O.; Lange Motor Truck Co., Pittsburgh, Pa.; Dayton Steel Foundry Co., Dayton, O.; *Commercial Car Journal*, Philadelphia, Pa.; and Cotta Gear Co., Rockford, Ill.

FORD NORFOLK PLANT READY

DETROIT, April 27.—The new assembly plant of Ford Motor Co. at Norfolk, Va., is now completed and production will be started in the near future. The plant has capacity for three hundred cars a day and will employ about twelve hundred men. The plant will be used to a considerable extent as a shipping point from which the Ford ocean-going and coastwise steamers operate, assembly sales operations, however, being sufficient to meet requirements of that territory.

Men of the Industry and What They Are Doing

Strachan Directs Pennsylvania Sales

Herbert M. Strachan has been appointed sales manager of the Pennsylvania Rubber Co. of America, Inc. He started with the company in 1917, was in Washington during the war handling contracts on masks, tires and rubber goods, and represented the Pennsylvania company in Michigan and Florida. He has had charge of the Washington branch of the company and later managed the Baltimore branch. Since April, 1923, he has been in the sales division at the factory.

Herbig Heads U. S. Truck Sales

E. T. Herbig has been appointed general sales manager of the United States Motor Truck Co. He was for five years sales and advertising manager of the Service Motor Truck Co. and was for two years in charge of the Nation Buyers department of General Motors. He was at one time vice-president of the Sales Managers Association and was the first chairman of the service committee of the National Automobile Chamber of Commerce.

Andree Leaves Root & Vandervoort

Paul Andree, who for the past 22 years has been connected with the Root & Vandervoort Motor Co., first as superintendent of the automobile plant and later as manager of the Cincinnati plant, has joined the organization of the Hoefer Manufacturing Co. as manager. This concern makes drilling and boring machinery.

Steele on Locomobile Staff

B. K. Steele, connected with the sales department of the H. H. Franklin Manufacturing Co. for the past six years, has resigned to accept a similar position with the Locomobile Co. of America, Inc. He will be associated with G. A. Hoyt, formerly assistant sales manager for Franklin and now Locomobile sales manager.

Dieckmann Becomes Distributor

Walter H. Dieckmann, for the last three years sales planning manager of the Chandler Motor Car Co., has become Buffalo distributor for the Ray Manufacturing Co., maker of Auto-Vac. Previous to his connection with the Chandler company he was with the Pierce-Arrow Motor Car Co.

Whitworth Joins Bendix

Stanley Whitworth, recently works manager of the Sheldon Axle and Spring Co., has become factory manager of the Bendix Brake Co. plant in South Bend. He was formerly with the Nordyke and Marmon Co. and later assistant general manager of the Stutz Motor Car Co. of America.

Graham Succeeds Abeles

James A. Abeles has resigned as president of Motor Improvements, Inc., maker of Purolator, and is being succeeded by John A. Graham, formerly sales manager of the Houdaille Shock Absorber Co. Mr. Abeles' health has been failing; he will continue as vice-president of the company.

Murphy with Velie Sales

Announcement has been made of the appointment of L. F. Murphy as assistant sales manager of the Velie Motors Corp. He has been connected with the Ford Motor Co., General Motors Export Corp., the Studebaker Corp. and was manager of the Studebaker branch in Indianapolis.

O'Meara with Electrograph

J. W. O'Meara has become eastern sales manager for Electrograph Co., Detroit, sales development service. He was at one time publicity manager of the B. F. Goodrich Rubber Co. and was recently a director of the Premier Co.

Heminway Will Go to Brussels

M. L. Heminway, general manager of the Motor and Accessory Manufacturers Association, will represent that organization at the meeting of the International Chamber of Commerce in Brussels in June.

Hutchins Moved to Coast

J. B. Hutchins has been appointed sales manager in the Oakland, Cal., territory for the Goodyear Tire and Rubber Co. He has been with the Goodyear company for nine years in the East.

Lawrence Elected Wright President

Charles P. Lawrence has been elected president of the Wright Aeronautical Corp., and J. F. Prince has been named secretary-treasurer. Mr. Lawrence was formerly vice-president.

Wilson Heads Beckwith Chandler Sales

J. Alex Wilson, who has been in charge of the pyroxylin development of the Beckwith Chandler Co., Newark, has been appointed sales manager of the company.

New Equipment Mart to Open in Chicago

CHICAGO, April 25—Arrangements have been completed for the formal opening here on May 22 of the Automotive Equipment Mart, to be permanently maintained by the Automotive Manufacturers Association at 1315 South Michigan Avenue.

This action was taken at a recent meeting of the board of directors of the association, when W. E. Green, the secretary, was placed in charge of the mart. He will have complete charge of all the exhibits, and will be assisted by a specially selected staff.

An entire floor has been leased at the new address, with provisions that enables the association to secure more space when the occasion arises. The location is ideal, being situated at the "head" of the Michigan Avenue automobile row and within walking distance of the loop district.

Since announcement of the association's intention to form the mart, letters have been received from manufacturers and jobbers throughout the country in which the idea is given complete acclamation. The association anticipates no difficulty in securing a high number of exhibitors.

As stated previously, the purpose of the association in having the mart is to afford automotive manufacturers, whose plants are located throughout the country, space for displaying their products under competent sales representation. This will enable the manufacturer to have the equivalent of a well equipped branch office and central room at a nominal cost.

Tractor Firms Merge

(*Continued from page* 802)

Combined sales of the two merging companies for 1924 were approximately $17,500,000, and sales to date this year indicate that this figure will be exceeded for 1925. The Best company's earnings for 1924, before Federal income taxes, were $901,000 on a sales volume of $5,300,000; similar earninigs for 1923 were $703,000 on a sales volume of $4,000,000. The sales volume of the Holt company each of the years 1923 and 1924 was in excess of $12,000,000. It is estimated that earnings of the new corporation, based on present orders, for 1925, before Federal income taxes, will be approximately $2,250,000.

Quick assets of the new corporation, as of December 31, 1924, are placed at $11,974,027, while the floating debt at the same date amounted to $4,182,242. It is planned to pay off this indebtedness this year.

CLEVELAND FLAT RATE

CLEVELAND, April 27—The Cleveland Automobile Company announces that within a few weeks it will issue to its dealers a complete flat rate system covering the various models of Cleveland cars.

More Price Cuts in British Markets

Renault and Lorraine Lower—Ford Starts Assembly Conveyor at Wembley

LONDON, April 17 (*by mail*)—A special conveyor has been made by the Ford Motor Co. (England), Ltd., for service at Wembley. A picked staff of Ford employees will be on duty daily building at the rate of 16 Fords per day. These cars will be supplied from the exhibition straight to local dealers.

The site of the Ford stand will be at the Watt Gate entrance of the Palace of Housing and Transport, known last year as the Palace of Engineering. The area occupied will cover about 11,000 sq. ft. In addition to the conveyor exhibit, part of the space taken will be occupied by a full display of Ford models.

Several models in the Renault range have been reduced as follows:

		Old Price	New Price
8.3 hp.	2-seater and dickey	£230	£219
	All-weather	£265	£255
	4-seater torpedo	£260	£245
	4-seater saloon.	£285	£275
	Coupe de ville..	£305	£295
13.9 hp.	Standard torpedo	£377	£357
17.9 hp.	English torpedo	£595	£585

The Lorraine "Six" chassis has been reduced from £515 to £465. Similar reductions are made on all complete cars. Additional new models, both with French coachwork, are a five-seater torpedo, £495; and a five-seater saloon, £650.

Home firms still report satisfactory progress. B. S. A. profits for 1924 were £305,320, against £250,320 for the previous year, while the Albion Motor Car Co., Ltd., realized a profit of £85,900 in 1924.

It is estimated that the number of cars sold in Britain during the fortnight before Easter was 15,000.

Will Make Proposals on Highway Measures

WASHINGTON, April 30—Proposal that the motor vehicle tax should be simple in form, that it should be distributed in equitable proportion among different types of vehicles, and that it should be levied only by the States, will be one of the leading questions to be placed before the United States Chamber of Commerce at its annual meeting here May 20-22 by the National Automobile Chamber of Commerce.

Another proposal to be made by the chamber at this annual conclave will be "a declaration advocating uniform highway direction and warning signs for the convenience and protection of travelers and indorsing the efforts of a committee of Federal and State highway engineers, appointed by the Secretary of Agriculture, to formulate a policy acceptable to all States."

Concerning highways, the Chamber will still further propose a declaration indorsing the principles formulated by the joint highway transport committee of the American Association of State Highway Officials and the National Automobile Chamber of Commerce.

CUBA CONTEMPLATES HIGHWAY CAMPAIGN

NEW YORK, April 29—That Cuba is orienting toward a governmental policy of more widespread highway building was indicated by General Gerardo Machado, President-elect of Cuba, in a reception tendered him here last night at the Hotel Commodore by automobile executives and exporters. With the building of these contemplated highways, General Machado, evidencing a keen interest in the economic betterments that would follow the adoption of better transportation, estimated that the 35,000 automobiles now in use in Cuba would be doubled. He expressed the hope that American manufacturers would find this enlarged market for their products, stressing the strengthening business and social ties between his country and the United States.

The meeting was arranged by the National Automobile Chamber of Commerce and was presided over by John N. Willys. About 100 executives and export managers, both of automobile and equipment companies, were in attendance.

Royal T. McKenna Named New M. A. M. A. Counsel

NEW YORK, April 29—Royal T. McKenna, Washington, D. C., has been elected general counsel of the Motor and Accessory Manufacturers Association, it is announced by M. L. Heminway, general manager. Mr. McKenna succeeds S. S. Meyers, resigned.

The new general counsel has had long experience with Government matters in Washington. He was associated with Senator Joseph T. Robinson of Arkansas in law practice; was for five years attorney and examiner for the Interstate Commerce Commission, and during the war was attorney for the Director General of Railroads.

A new member was elected to the board of directors of the M. A. M. A. —E. V. Hennecke, vice-president of the Motometer Co., Long Island City, N. Y., succeeding G. Brewer Griffin, who retired because the work he recently assumed for the Westinghouse Electric & Manufacturing Co. took him out of the automotive field.

FINANCIAL NOTES

Chrysler Corp.—April 20, 1925, the New York Curb Market admitted to unlisted trading privileges Chrysler Corp., not to exceed 275,000 authorized shares preferred stock of no par value of $100 par value as might be determined, and not to exceed 800,000 authorized shares common stock no par value or $100 par value as might be determined, both securities "when issued" under the plan and agreement of the Maxwell Motor Corp. dated April 15, 1925.

Industrial Acceptance Corp., organized to handle the automobile acceptance business for the Studebaker Motor Car Co., as of Jan. 31, showed cash, $4,242,877, Studebaker dealers notes and acceptances, $16,448,861, and total assets of $22,596,167. Liabilities consisted of collaterial trust gold notes outstanding of $14,828,500, notes payable for Canadian operation, $416,959, drafts in transit, $272,000, accounts payable, $35,851, and reserves and accruals $261,735.

Paige Detroit Motor Car Co., as of December 31, 1924, reports total current assets of $8,959,289, against total current liabilities of $2,867,827, leaving net working capital of $6,091,462, as compared with $4,316,385 the previous year. April 20, 1925, the company applied to the New York Stock Exchange to list 615,000 shares of no par common stock.

Stewart-Warner Speedometer Corp., for the quarter ended March 31, 1925, reports net income after depreciation and taxes of $1,303,972, against $1,496,700 the first quarter of 1924, equal respectively to $2.17 and $3.15 earned on the capital stock, which was 600,000 shares in 1925 and 474,980 in 1924.

Maxwell Motor Corp.—April 22, 1925, the New York Stock Exchange admitted to the list Central Union Trust Co. of New York certificates of deposit for $23,769,800 8% noncumulative class "A" preferred stock and 661,737 shares of class "B" no par common stock.

Prest-O-Lite Co., as of December 31, 1924, reports current assets of $3,098,020, and current liabilities of $10,706,785, leaving an excess of current liabilities of $7,608,765, against $6,743,815 the previous year.

Norwalk Tire & Rubber Co., for 1924 reports net income of $125,205, against $140,045 for 1923, equal to $10.13 and $11.33 respectively on the preferred stock.

Motor Wheel Corp., in accordance with permission granted by the New York Stock Exchange, has listed 60,542 additional shares of no par common stock.

General Motors Corp. announces that it now has 60,458 stockholders as compared with 66,097 at the end of the preceding quarter.

FISHER BODY EXPANDS

PONTIAC, April 27—The body plant operated here by Fisher Body Corp., for the Oakland Motor Car Co., will be expanded by the building of a new unit with 40,000 ft. of floor space to cost $175,000. Work on the new unit will start at once. Continued popularity of Oakland's closed models has made the added capacity for body manufacturing necessary, it was stated. The present plant has about 500,000 ft. of manufacturing space.

Income Statements Show Gain in 1925

Parts Makers Also Show Better Condition First Quarter Than Last Year

NEW YORK, April 29.—An analysis published by AUTOMOTIVE INDUSTRIES last week, showing the financial statements of several representative motor companies for the first quarter of the year were indicative of a much more prosperous condition of the industry than was evidenced early in 1924, is supplemented by an extremely favorable statement from the Pierce-Arrow Motor Car Co., and by other figures that show the parts and equipment manufacturers are sharing in the general tendency.

The Motor Wheel Corp., the Eaton Axle & Spring Co. and Sparks-Withington Co. are some of the equipment makers that have issued reports auguring an unusually good year financially.

Pierce-Arrow Report

The Pierce-Arrow quarterly report gives net income after charges of $200,416, equal, after allowing for prior preference dividends, to $1.68 a share on the cumulative preferred shares, compared with $78,729, or 47c. a share, on the preferred in the March, 1924, quarter. Says a statement by the company:

> During the March quarter, shipments ran slightly over 70 per cent in excess of the three months to March 31, 1924. The March business was the largest of any month since May, 1920, and the company continues to enjoy favorable prospects for the current quarter. It is probable that April shipments will show the largest total of any month except during the war period.
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> The company recently retired $500,000 of bank loans, reducing its bank obligation substantially below the December 31, 1924, figures. At the present time, cash in hand materially exceeds the amount of bank borrowings.

The Eaton Axle & Spring Co. reports income for the quarter, after charges but before Federal taxes, of $153,198, against $113,103 for the corresponding quarter of 1924, equal respectively to 67c. and 50c. earned on the stock outstanding. Net working capital as of March 31 was $2,155,276, against $1,944,002 on the same date last year.

Accessory Firms Gain

Sparks-Withington Co., automobile horn manufacturers, report net income for the quarter of $208,025 after charges, preferred dividends and taxes, equal to $5.30 a share on the common stock, against net profits for the entire year 1924 of $233,393, equal to $6.70 a share. Working capital is $534,360, against $461,043 a year ago. Besides the regular dividend of 75c. a share on the 37,220 shares of common stock, an extra payment of 50c. is being made.

The Motor Wheel Corp. reports show net income for the March quarter of $767,366, after interest, Federal taxes and other charges, equal after preferred dividends to $1.49 a share on the outstanding 490,891 shares of no par common stock.

Perhaps even more significant than the figures for the first quarter from automobile and parts makers is the estimate of F. J. Haynes, president of Dodge Bros., that earnings before Federal taxes for his company will be $14,000,000 in the first six months of the year, against $19,965,440 for the full year 1924.

New Sedan at $1,680 Added to Flint Line

FLINT, April 28—In addition to the brougham and touring car, a five-passenger sedan now is included in the Flint "40" line. This body, which is finished in blue Duco with black above the belt, is mounted on the standard 115 in. wheelbase. The windshield is made in one piece and is equipped with an automatic wiper. Windows in the four doors and the rear quarters are controlled by automatic lifts, which eliminate the usual cranks. A pressed metal button trips the mechanism for either raising or lowering the sashes. Interior finish is in striped blue cloth.

Full equipment including front bumper, motometer, spare tire and cover, stop lamp, heater, windshield cleaner and rear view mirror is included in the factory price of $1,680. Full balloon tires measuring 30 x 5.77 are mounted on disc wheels, while steering is by a Ross-Warner cam and lever gear. All Flint models are equipped now with Lockheed self-energizing three shoe internal brakes bearing on drums of 14 in. diameter. The emergency brake is mounted back of the gear set, which is hung amidships. Center position is used for the gear shift lever, while the emergency brake lever is located adjacent to the left front door post. Interior equipment also includes smoking and vanity sets. Drum type head lamps of 8 in. diameter and cowl lamps of similar design are standard equipment. The four-bearing six-cylinder engine of 3⅛ in. bore and 4¼ in. stroke is continued.

Sees Fertile Field in Foreign Markets

NEW YORK, April 29—A growing demand for American automotive products in all parts of Europe is seen by Xavier de Nice, export manager, American Chain Co., who recently returned from an extensive trip through practically all the European countries.

He said this demand would hardly be more pronounced in certain lines than in others but that the sale of cars, trucks, buses and accessories and equipment should all be made in consistent proportions. According to Mr. de Nice, the Scandinavian countries particularly are a fertile field for American automotive manufacturers. He emphasized the possibilities of Russia as a market of the future.

METAL MARKETS

Liquidation of iron and steel prices appears to have run its course for the time being. From present indications, if there should be any further decline in the demand, which is hardly likely, this will be more than offset by the shrinkage in operations. Considering prevailing production costs, prices have been stripped to the bone, and, as has been intimated within the last few days in various influential quarters of the steel industry, if there are to be further concessions, wage scales must give way first.

Probably sensing that steel producers are being forced more and more by market conditions to tackle the unpleasant problem of wage deflation, the unionized rolling mill workers have anticipated demands for reduced scales by demanding 15 per cent advance in the pay of sheet finishers and of 20 per cent in that of sheet rollers. Obviously this demand is for the purpose of permitting the union officials to compromise gracefully on a basis of unaltered rates when the manufacturers ask for assent to reductions.

The mills of the leading interest are only indirectly affected by these negotiations as they are non-union, but in actual practice the pay of the non-union craftsmen is naturally based to a greater or lesser extent on the union scale, this all the more so as in sheet production the leading interest trails behind the independents in importance, a condition not at all unpleasant amid the prevailing awry position of the sheet market.

So far as concerns automotive steels, the reduction on freight rates from Pittsburgh to points west ordered by the Interstate Commerce Commission, which is heralded in some quarters as nullifying abolition of the "Pittsburgh plus" method by the Federal Trade Commission, is of minor importance, the principal territory affected being beyond the Mississippi.

Unless general economic conditions shape themselves so that the problem of deflating production costs through a general downward revision of wages can be approached more energetically than seems likely or possible at this time, steel prices may be accepted to have struck bottom. There may be further readjustments in some descriptions, such, as for instance, sheet bars which are out of gear with sheet prices and with other steel products, but the general tendency will be in the other direction.

Pig Iron—The market has given way further, and is now on a $20, valley furnace, base for No. 2 foundry. Hand-to-mouth buying by automotive foundries continues, and there is no indication of consumers trying to protect themselves against a possible turn in the market.

Aluminum—The position of the domestic industry, always more or less of a mystery because of the sole producer's reticence, is even more of an unknown quantity at this time than usual. Odd lots continue to come in from Norway, England, and other European countries. Recently a shipment of 2199 ingots came in on a German steamship. Motor passenger car builders who use large quantities of aluminum appear to be protected by contracts. The market, what there is visible of it, seems strong.

Copper—The red metal seems to have started to retrace its steps toward higher levels,

Tin—Sentiment is rather bullish, but consuming demand light.

Calendar

SHOWS

April 22-May 7 — Melbourne, Australia, International Automobile Show, under the auspices of the Chamber of Automotive Industries, in conjunction with the Royal Automobile Club of Victoria.

May 20-23—Detroit, Second Annual Automotive Maintenance Equipment Show, General Motors Building, conducted by the National Automobile Chamber of Commerce, with cooperation of the Motor and Accessory Manufacturers Association, National Automobile Dealers Association, Society of Automotive Engineers, Automotive Equipment Association, Automotive Electric Association and the Automotive Manufacturers Association, Sam Miles, manager.

Sept. 21-26—London, England, Annual Cycle and Motorcycle. Show under auspices of the British Cycle and Motorcycle Manufacturers and Traders Union, Ltd.

Oct. 8-17 — London, Olympia passenger car show.

Oct. 29-Nov. 7—London, annual truck show.

Nov. 26-Dec. 6 — Berlin, Germany, Annual Automobile Show in the Kaiserdamm.

RACES

May 11—Charlotte, N. C.

May 30—Indianapolis.

June 13—Altoona, Pa.

June 20—Baltimore, Washington Speedway, Laurel, Md.

July 26—Paris, Montlhery Track, French Grand Prix.

Sept. 7—Altoona, Pa.

Sept. 30—Fresno, Cal.

Oct. 10—Baltimore-Washington Speedway, Laurel, Md.

Oct. 24—Charlotte, N. C.

Nov. 26—Los Angeles.

CONVENTIONS

May 6-9—Ninth annual meeting of the American Gear Manufacturers Association at William Penn Hotel, Pittsburgh.

May 20-22—Washington, Annual Meeting of the United States Chamber of Commerce.

May 20-23—Milwaukee, National Association of Purchasing Agents.

May 20-23—Detroit, General Motors Building, National Automotive Service Convention conducted by the National Automobile Chamber of Commerce with the cooperation of Motor and Accessory Manufacturers Association, National Automobile Dealers Association, Society of Automotive Engineers, Automotive Equipment Association, Automotive Electric Association and Automotive Manufacturers Association.

May 26-27—Regional Motor Transport Conference under auspices of National Automobile Chamber of Commerce in Chicago. "Coordinated Transportation" will be the theme of the conference.

June 1-3 — Detroit, American Body Builders' Association at Hotel Statler.

June 22-27—Summer convention of the Automotive Equipment Association at the Broadmoor Hotel, Colorado Springs, Colo.

S. A. E. MEETINGS

National

June 15-19 — Summer meeting of the Society of Automotive Engineers at White Sulphur Springs, W. Va.

Sept. 15-16—Production meeting and exhibition.

Sept.—Automotive Transportation meeting.

Nov. — Service Engineering meeting.

Sectional

May 6—Milwaukee Section, Cooling Internal Combustion Engines, A. G. Herreshoff and F. M. Young.

May 7—Detroit Section, Finding Efficiency of New and Used Cars, R. B. Wasson.

Make Tentative Decision on Uniform Road Signs

WASHINGTON, April 25—The joint board on interstate highways, in session here this week reached a tentative agreement on the form and color of warning and directional signs to mark the principal interstate roads of the country. Highways to be marked as interstate roads, for which the name United States Highways has been proposed, will be selected after a series of regional meetings of members of the board with highway officials of groups of States.

The design tentatively proposed by the board consists of a United States shield with a white background bearing in black the letters "U. S.", the number of the route in large numerals and the name of the State in which the marker is erected. Colors tentatively adopted for non-luminous signs are yellow for warning and danger signs, and white for directional and informational signs, including the route markets. Lettering on both classes of signs will be in black. For luminous and reflecting signs the colors tentatively selected are red for danger, yellow for caution and green to indicate "go."

MacKINNON RESUMES WORK

WISCONSIN RAPIDS, WIS., April 27—The MacKinnon Manufacturing Co. of Wisconsin Rapids, Wis., manufacturer of motor car bodies, hubs, spokes, is disposing of $40,000 treasury stock and plans resumption of production, which was interrupted several weeks owing to the lack of adequate working funds. The authorized capital is $100,000. The plant will limit its future production to motor bus bodies, orders for which already on the books will require a full working crew of 50 for an indefinite period.

JUDSON VISITS HOME HE LEFT YEARS AGO

SAN FRANCISCO, April 28—R. W. Judson, president of the Continental Motors Corp., spent the middle of April in San Francisco. Mr. Judson left his home in Napa, near here, 22 years ago, headed for Chicago, with about enough money to pay his fare and feed him until he reached the big town. While here he is the guest of Norman DeVaux, vice-president and general manager of the Durant Motor Co. of California.

Less Automotive Taxes Collected This Year

WASHINGTON, April 29—Internal revenue collections from the automotive industry for March amounted to $7,858,294.18, or $4,987,356.33 less than collections for March, 1924, which were $12,845,650.51. A substantial decrease is also noted in the collections from the automotive industry for the period from July 1, 1924, to March 31, 1925, which were $84,346,764.25, as compared with $117,468,299.02 for the period from July 1, 1923, to March 31, 1924.

The segregated taxes collected from the automotive industry follow: Automobile trucks and automobile wagons in March, 1925, $460,541.68, as compared with $736,299.22 in March, 1924; other automobiles and motorcycles, $5,748,939.17 in March, 1925, as compared with $9,777,803.12 in March, 1924; automobile parts and accessories, $1,648,813.33 in March, 1925, as compared with $2,331,548.17 in March, 1924.

Rolls-Royce Reports 1924 Improvement

SPRINGFIELD, MASS., April 29.—Henry L. Fuller of New York has become active in his office of president of Rolls-Royce of America, to which he was elected recently. H. C. Beaver is in regular charge of the plant operations.

This statement regarding the company's affairs is made by the officers:

"The Rolls-Royce Company in 1924 greatly improved its position over the preceding year. The company ended the year without any bank loans, and with cash on hand of $424,000, as against bank loans at the end of 1923 of $295,000, and only $93,000 cash on hand. The ratio of current assets is 4.75 to 1 as against 3 to 1 at the end of the last year.

The efforts of the management of the company were directed during the year to the liquidation of its current position, and its inventory of used cars has been brought down to a very small figure in proportion to the volume of business done.

The works at Springfield are at the present time operating at a rate somewhat in excess of the same period a year ago, and are experiencing an increased demand for their product.

The company is constantly increasing its distribution and service facilities, and with the growing appreciation on the part of the public of the merits of its product, it is expected that the volume of business will steadily increase.

G. M. DIVIDEND

NEW YORK, April 27—The Board of Directors of General Motors at their meeting held today declared, for the second quarter of 1925, a dividend of $1.50 a share on the new common stock, payable June 12 to stock of record May 18, 1925; also quarterly dividends:

7% Preferred	$1.75	a share
6% Debenture	1.50	a share
6% Preferred	1.50	a share

payable August 1 to stock of record July 13, 1925.